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REPORT

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ON THE

Sewerage, Drainage and Sewage Disposal

FOR THE

CITY OF COLUMBUS, OHIO

OCT. 30, 1900.

JULIAN GRIGGS, C. E.
Engineer for the Sewer Commission.

COLUMBUS, OHIO
1901

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Columbus, Ohio, October 30, 1900.

Hon. L. B. Kauffman, President of the Sewer Commission and Director of Public Improvements:

Dear Sir: I herewith hand you an abstract of sundry reports heretofore made on the sewerage, drainage and sewage disposal of the city of Columbus, and the conclusions reached from our most recent studies with recommendations for installation.

First presenting a table listing the work recommended, with an estimate of cost:

TABLE NO. 1.

SHOWING WORK RECOMMENDED FOR IMMEDIATE CONSTRUCTION WITH ESTIMATE OF COST.

Sewage Disposal Plant, Septic System, Force Main	$355,907 00
Main Pumping Station and Accessories	82,127 00
Kelton Avenue Pumping Station	18,359 00
Main St. and N. W. R. R. Pumping Station	4,868 00
Force Mains from Kelton Ave. and Main St. Station	15,019 00
West Side Outlets and Interceptors	12,512 00
Second Avenue Relief Sewers and Branches	69,704 00
Russell Street Relief Sewer and Branches	30,400 00
Factory Street Drain	4,279 00
Central Relief Sewer	168,421 00
Fifth Street Branch	40,434 00
Long Street Extension	4,285 00
Washington Avenue Relief	14,230 00
Walnut Street Relief and Branch	23,365 00
Beck Street Relief and Branches	27,428 00
Oak Street Extension	1,392 00
West Broad Street Storm Water System	23,070 00
Glenwood Avenue Extension	2,155 00
Hartford Avenue Drain	1,821 00
Stimmel Road Drain	47,432 00
Sanitary Sewer Mains, Kian Run District	73,530 00
Sanitary Sewer Mains, West of Scioto River	197,848 00
Repairs to Peters' Run Sewer and Branch	16,033 00
Repairs to Spring Street Sewer	10,000 00
Repairs to North-West Trunk Sewer	401 00
Repairs to Indianola Sewer	2,281 00
Repairs to Joe Alley Sewer	839 00
Repairs to North Columbus Sewer	1,165 00
Extension of the Intercepting Sewer	3,306 00
1,000 New Manholes	50,000 00
500 New Catch Basins and Lead-offs	25,000 00
20 Automatic Gates and Manholes on Intercepting Sewer	6,000 00
Total for Work Recommended	$1,364,346 00

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SEWAGE DISPOSAL.

The sewage disposal for Columbus is a difficult problem, involving a large expenditure of money. It has required much thoughtful study and the preparation of sundry plans and estimates of cost of installation.

The method of double coke filtration recommended by Mr. Alvord, was first studied. Since the date of his report, however, several facts have been established by experience which were not then apparent.

The experiments of the Massachusetts State Board of Health, as well as works on a large scale in England have demonstrated that the early expectations concerning the permanence of coke beds have not been realized, that after working a few years at the high rates which formed their chief merit, they gradually become clogged and require a renewal of their filtering material or some inexpensive and effective method of cleaning the same not yet discovered.

On this account a preliminary treatment of the sewage either chemical or by septic tank, is now universally conceded as essential to the success of contact beds.

Plans for such a purification to be located on the English farm were made for Columbus on the basis of a flow of 20,000,000 gallons of sewage per day with 12 hours of septic treatment, followed by nitrification in 54 acres of double coke contact beds, five feet deep, working at the rate of 600,000 gallons and 1,200,000 gallons per acre per day for the primary and secondary beds respectively.

Such an installation, mainly owing to the present price of coke, it was found would cost $1,053,000.00. Whether or not clogging at longer intervals will occur by this method has not yet been demonstrated, but conservatives fear such a result.

This uncertainty, together with the great cost, seemed to set aside the method as a possibility for Columbus.

Some investigation was then made to substitute for the coke on the same area the old and well-tried method of intermittent sand filtration, but with the depth of sand usually employed and the increased area required by this method, the cost still appeared so high as to stimulate the search for a satisfactory substitute.

Project No. 3 of Mr. Alvord's report, was next considered and a plan worked out by changing the preliminary process suggested from a chemical to a septic treatment followed by inter-

mittent filtration on 72 acres of land, located on the Miller and Schwenker farms. On the basis of 20,000,000 gallons per day this would require a purification on the beds of 277,000 gallons per acre per day, preceded by a 12-hour septic treatment. An estimate of cost of this plan is shown in Table No. 2, page 22 of the appendix.

In order, however, that no mistake be made in so important a matter, a re-examination of the material underlying these farms was begun by means of test pits from seven to eleven feet in depth. The information thus developed led to a distrust of its suitability for the filtration at the high rates necessary, and the setting aside also of this project.

The difficulties surrounding the various schemes for sewage disposal, which have been studied, lead me to recommend a partial process and the use of the septic tank system, by installing twenty concrete tanks of 500,000 gallons each, by which a purification of about 50 per cent. is expected, as measured by reduction in albuminoid ammonia or oxygen consumed.

The reasons for this recommendation are as follows: The process, while it is one of the oldest, has lately been receiving a large share of attention, on account of the new discovery that the purification effected is really due to the presence and action in the sewage of microscopic organisms, liquefying and breaking up the organic matter in the same.

Much experimental work with this process has been done since it received its first extensive application at Exeter, England, in 1896. A number of successful installations have been made and valuable results obtained on a large working scale at many points by use of old chemical or storage tanks for the new septic process.

The best rate of flow has not yet been determined for all times and conditions, but may at present be placed between the limits of 2 and 24 hours. After one year of experimental work with the septic tank, the 1898 report of the Massachusetts State Board of Health speaks on this question at pages 438, 445 and 446 as follows:

"The sewage remains in the tank from twenty-four to thirty-six hours, and the tank is always kept full, sewage being run into the tank when any is withdrawn, and at the same rate.

"Our studies have also indicated that it is probable that a much smaller septic tank can be used in proportion to the volume of sewage flowing, especially where this volume is large, than has been proposed abroad, for this reason:

"The sewage of ordinary age—that is, one which has traveled for any considerable distance in the sewers—will, when it reaches its point of disposal, be practically free from dissolved oxygen, all having been exhausted before reaching this point. If such a sewage is run into a properly built septic tank, no air will be carried in with it, and the length of time which it remains within the tank needs to be only long enough to allow a precipitation of the organic matters in suspension, and the accumulation of the fats upon the surface of the sewage.

"These matters can remain in the tank for an indefinite period—being added to, of course, each day by the sewage flowing through—and, by action of the bacteria of decomposition and putrefaction a large percentage of the sludge will be slowly changed to the soluble form, and pass away to a large extent, perhaps in the effluent of the tank.

"It seems to be doubtful if it is necessary to have this tank air-tight; it is also doubtful if it is necessary to exclude light, experiments made at Lawrence seeming to show that the action goes on as well in the presence of air over the surface of the sewage and with light, as it does without air and without light.

"Of course, with an air-tight tank the gases can be prevented from escaping into the air, until just before running into the sewage filters, and at that time, they can be taken care of, and thus prevented, perhaps, from making the tank and its surroundings a nuisance."

Concerning the extent of the purification effected in this case, an analysis as it enters and leaves the septic tank is shown as below stated in parts per 100,000, pages 438 to 439 of the same:

SEWAGE OF SEPTIC TANK.

Item.	Entering.	Leaving.
Free ammonia	4.44	4.86
Albuminoid ammonia	.79	.41
Oxygen consumed	4.00	2.29
Chlorine	9.21	10.01

Which is a purification of 48.1 per cent. measured by reduction of albuminoid ammonia, or 42¾ per cent. measured by oxygen consumed.

At Exeter the ordinary daily sewage discharged is about equal in volume to the capacity of the tank, but the storm flow, which is limited by the size of the main leading to the tank, is about four times as great as the dry weather flow; hence the time required for the passage of sewage through the tanks is from six to twenty-four hours, a statement and practice which clearly shows that the strength of sewage is deemed important as affecting the size of tank installation required.

At Manchester, England, the experts recommended the conversion into septic tanks of the old chemical tanks, formerly in-

stalled, raising the walls to increase the capacity from twelve million gallons to fifteen million gallons for the twelve-hour treatment of a normal flow of thirty million gallons of sewage for a population of 600,000 persons (present flow twenty-four million gallons per day), the ratio of volume of sewage to population, above noted, indicates a much stronger sewage than is found in America.

In times of storms they expected to increase the flow treated to ninety million gallons per day, which would materially shorten the period of septic treatment, although for excess storm water four roughing tanks of a combined capacity of four million gallons were provided for use in such emergencies. As the chief purification was here expected in the contact beds which followed the septic treatment, high efficiency in the latter was of not so much importance.

At Leeds, England (population 420,000) experimental work on a large scale has been in progress for more than two years, and in the report of July, 1900, page 84, a table is given, showing purification effected by 12, 24 and 48 hours' septic treatment, indicating that twenty-four hours is the more suitable period with a very strong domestic and trade sewage found there.

For your convenience the table is copied below, as also a statement of the advantages found there in the use of the septic tanks:

"AVERAGE OF ANALYSES REFERRING TO THE EFFECT OF DIFFERENT RATES OF FLOW THROUGH OPEN SEPTIC TANKS.

	Grains per Gallon.		
	12 Hours' Flow.	24 Hours' Flow.	48 Hours' Flow.
Total solids in effluent	88.0	78.2	78.6
Solids in suspension in effluent	19.6	11.5	10.9
Free ammonia	1.41	1.5	1.55
Albuminoid ammonia	0.502	0.348	0.377
Oxygen absorbed, 4 hours, 80 degrees F.	5.710	4.370	4.270

"Briefly, the advantages found in the use of septic tanks were:

"First. The production of a practically uniform effluent from sewage of such varying composition as that of Leeds.

"Second. The digestion of part of the solids in suspension, which at Leeds amounted to about 40 per cent. of those originally in the sewage.

"Third. The anærobic putrefaction which takes place in the septic tank facilitates subsequent filtration, rendering the filtrate less liable to secondary putrefaction."

At Champaign, Ill., a septic tank for the purification of 300,000 gallons per day has been in operation since 1897. The plant was designed by A. N. Talbot, Professor of Municipal and Sanitary Engineering, University of Illinois, and grew out of his design of a similar plant for the city of Urbana, Ill., in 1894.

An article by the designer, published in the Engineering News, August 17, 1899, gives many statements of interest, concerning the operations of this plant, from which the facts below noted are obtained.

Champaign has a population of about 10,000 people, with 24 miles of sanitary sewers. The sewer connections made up to August, 1899, served a population of 3,500 with a daily average flow of 300,000 gallons, increased at times by ground water to several times this amount.

The effluent is in Salt Fork creek, a small prairie stream, with a dry weather flow of two to six cubic feet per second, and which in extremely dry seasons runs entirely dry for two months. Yet throughout much of the year has a flow of ten to twenty cubic feet per second.

ANALYSES.

Three separate analyses of raw sewage and septic effluent are recorded and shown as below tabulated.

SAMPLE OF NOV 22, 1898—PARTS PER 100,000.

	Raw Sewage.	Septic Effluent.	P.C. of Purification.
Albuminoid ammonia	.368	.064	82.6
Oxygen consumed	4.150	.930	77.6
Chlorine	5.000	5.000	....

SAMPLE OF FEB. 6, 1899—PARTS PER 100,000.

	Raw Sewage.	Septic Effluent.	P.C. of Purification.
Albuminoid ammonia	.592	.054	90.9
Oxygen consumed	4.900	.860	82.4
Chlorine	4.900	4.900	....

SAMPLE OF MAY 3, 1899—PARTS PER 100,000.

	Raw Sewage.	Septic Effluent.	P.C. of Purification.
Albuminoid ammonia	.336	.036	89.2
Oxygen consumed	2.760	.650	76.4
Chlorine	5.100	5.000	....

Average purification for the three analyses above by reduction of albuminoid ammonia, 87.6 per cent.; by reduction of oxygen consumed, 78.8 per cent.

It is stated that this effluent has been sufficiently pure to permit its discharge into the creek and that no objectionable results have been noted in the water below.

No odor is noticeable around the tank, the sludge resembling prairie loam.

The designer thinks that the tank capacity should probably be not less than four hours' flow of sewage, and remarks that it is quite doubtful if the provision for a capacity equal to 24 hours' flow is necessary or desirable.

In a report dated January 18, 1899, on sewage disposal for the National Soldiers' Home, in Santa Monica, Cal., by James D. Schuyler, a personal letter by Professor Talbot describes the deposits on the bottom of the tank, which may be removed once every year or two, as:

"A thick black silt-like material, containing about 60 per cent. water, 35 per cent. inorganic matter and 5 per cent. organic matter. The inorganic compounds are so stable that after removal they do not seem to give off any particular odor, though at the time of cleaning out the tank and around the pit into which the sludge is discharged, there is an odor similar to that of dirty water, I do not think it could be noticed 300 feet away.

"At other times there is no perceptible odor in the neighborhood of the tank, though it must be borne in mind that the effluent discharges into the stream under water. By putting one's nose close to the end of the effluent sewer where the air current comes out of the sewer, a slightly musty swamp-like odor may be detected.

"I have had a bottle of the effluent in my office for five months, and have not at any time found any odor, which indicated decomposition. There has been a slight growth of greenish algae in the bottle similar to that which is found about horse-troughs supplied with good well water."

The high professional standing of Professor Talbot gives more than ordinary weight to his observation.

These results are the more remarkable for the reason that the size of the tank with a capacity of 22,000 gallons would require, if the flow were uniform, a tank period of 106 minutes, or less than two hours, while the doubling of the flow would reduce the same to less than one hour.

This is partly explained by the fact that about three hours are normally required for the sewage to pass from the town to the disposal tank. The sludge at the bottom of the pit is described as "a black, muddy-looking, silt-like" deposit.

The average of two analyses of the sludge was as follows:

	Per cent.
Water	60.9
Organic mater	4.7
Inorganic matter	34.4
Total	100.00

The scum contains:

	Per cent.
Moisture	92.0
Organic matter	3.0
Inorganic matter	5.0
Total	100.00

Pawtucket, R. I. (36,000 population) has about 12,000 of its people served by a sewerage system and disposal works of intermittent sand filtration, built some years ago. To store the night flow they had two shallow tanks, covered with wooden roofs, located not more than 600 feet from the main street of the city with its trolley line and a good class of dwelling and business houses.

The capacity of these tanks is 66,000 gallons each, and the daily flow of sewage is given as 130,000 gallons, increasing when it rains.

The use of these tanks for the septic process began January 13, 1900, and has been continued to the present time. The effluent being filtered on the sand beds for a further purification.

Since the bacterial action in the tanks came to be established, the Rhode Island State Board of Health, by its chemist, Mr. Ernest T. Badger, has been making weekly analyses of the raw sewage and septic effluent and has found from the average of ten analyses a purification, as measured by a reduction in albuminoid ammonia, 48.95 per cent.; reduction in oxygen consumed, 54.4 per cent.

The maximum reduction for the period by albuminoid ammonia is 60.1 per cent.; by oxygen consumed is 67.7 per cent. The minimum reduction for the period by albuminoid ammonia is 31 per cent.; by oxygen consumed 35.7 per cent. The minimum reduction was obtained the first week observations were made. The leathery scum as observed by the sewer commissioners in August, 1900, was about three inches in thickness. The sediment from the tank was only near the inlet, which was untrapped. There were no offensive odors connected with the operations of the works.

At Worcester, Mass., one of their chemical tanks, 162 2-3x 40x7 feet, has been used now since May, 1900, as a septic tank for the treatment of 300,000 gallons of crude sewage per day, which reduces to a 24-hour period, by which a 29.22 per cent. purification is obtained. The septic effluent is being treated intermittently on sand at the rate of 112,375 gallons per acre per day.

It may be remarked that at these works, which are perhaps the most intelligently managed in the world, about seventeen million gallons of sewage per day are treated by the lime process, and a high degree of purification effected, for this method, at an expense of about 35c per capita for a population of 125,000 people.

The degree of purification obtained is shown in the table below from the report of Mr. Harrison P. Eddy, Superintendent of Sewers:

"PER CENT. OF ORGANIC MATTER REMOVED FROM SEWAGE AT WORCESTER, MASS., BY CHEMICAL PRECIPITATION."

Date	Total Amount By Albuminoid Ammonia.	Total Amount By Oxygen Consumed.
1893	48.49	33.65
1894	50.79	43.84
1895	61.53	54.35
1896	53.92	51.62
1897	53.42	52.00

It is worthy of note, how very little greater is the purification effected by this expensive treatment than is now being accomplished by means of the septic tanks.

Other comparisons and contrasts are of interest at this point. The Blackstone river, which receives the effluent from the Worcester disposal works, has for its total drainage area in Massachusetts, 260 square miles, as against 1560 square miles for the Scioto and its tributaries above the proposed Columbus disposal works. The valley of the Blackstone river is a succession of populous manufacturing villages, from Worcester to Providence, a distance of 48 miles. Below is a list of cities and villages, given in geographical order, with population as shown by a Rand and McNally pocket map, the first being Millbury, less than three miles below the disposal works.

Name.	Population.
Millbury	26,000
Saunders	550
Farnumsville	50
Rockdale	200
Northbridge	4,603
Centerville	370
Uxbridge	1,125
Milville	2,400
Blackstone	3,200
Woonsocket	20,830
Manville	2,200
Albion	900
Ashton	925
Lonsdale	1,225
Valley Falls	2,000
Central Falls	4,650
Pawtucket	27,633
Providence	132,146

It is known that the waters of the Blackstone are used for manufacturing purposes, and that the wastes in the river have prevented the making of certain delicate fabrics; when we consider that the Scioto river below Columbus is used for neither manufacturing nor water supply purposes; that there are no populous villages on its banks until Circleville is reached, with 7,000 people, thirty miles away, with hardly a house standing as near as one-half mile from the river bank in that distance; and that the waters of the Scioto by natural oxidation reach a state of comparative purity in less than thirty miles, as shown by the chemical survey of the river by the State Board of Health in 1897, it seems reasonable that a purification of Columbus sewage which would remove forty to fifty per cent. of organic matter and reduce the remainder to a condition more easily oxidized should, for the present, and until conditions are materially changed, be considered an abundant provision.

The relative proportion of evils and benefits, also should not be lost sight of. It is of vastly more importance that the citizens of Columbus be supplied with pure drinking water throughout, than that a small portion of the rural population below Columbus be relieved from the occasional offense of a musty odor from the river.

The reasons why the septic tank is herein proposed and should be approved, may be briefly summarized as follows:

First. It has been proved a scientific method of sewage disposal, accomplished by the aid of bacteria, possibly assisted by chemical compounds known as enzymes.

Second. It has been shown equal in all respects, and at times superior, to the well-known and well-tried method of chemical precipitation.

Third. Chemical precipitation has been found a thoroughly satisfactory method of disposal under certain conditions, as witness the sewage disposal works at Canton and Alliance in this state.

Fourth. If conditions were made to order they could hardly ever be found more favorable to a partial process than at Columbus, due to the opportunity for dilution in a river of considerable size, the non-use of the river below Columbus for manufacturing purposes, the comparative short distance within which purification is now effected by natural processes, and the absence of a large population living upon the banks of the river below the disposal works to be injuriously affected by a method of disposal less than perfect. The cost of such an installation with accessories and the necessary force main would be $355,907. The estimated cost is shown in detail in Table No. 3, page 23 of the appendix.

PUMPING STATIONS.

A main pumping station to control the storm water on the low ground west of the Scioto and lift the sewage of the city to the purification works is necessary to any plan of sewage disposal. Such a station would be located near the river, about 2200 feet south of the Greenlawn avenue bridge.

The plan for such a station to pump 40,000,000 gallons per day as shown in the Alvord report is recommended with slight modifications in some of its details, which with its equipment, a suitable coal siding and protecting levee is estimated to cost $82,-127.00; shown in Table No. 4, page 24 of appendix.

Two pumping stations for lifting the Alum creek sewage to a point near Luckhaupt avenue and Mound street, from which it would flow west to the intercepting sewer by gravity, are required on the northeast sewer in Main street.

The principal station which would handle 90 per cent. of the dry weather flow has been planned with a covered reservoir of 300,000 gallons capacity and two pumps each of 1,000,000 gallons capacity in 24 hours, driven by electric motors.

The smaller station would have a covered reservoir of 25,000 gallons, and one pump of 250,000 gallons in 24 hours with space for the future installation of another pump and motor.

The force main is designed to carry with economy the sewage for a population tributary to the Franklin Park sewer of 30 per acre at 80 gallons per capita per day. The present population is estimated at 10 per acre. The machinery is designed to pump the sewage of 12½ persons per acre.

The machinery of the Kelton avenue station is designed to take the flow from 865 acres of tributary area south of Long street at the rate of 80 gallons per capita and 30 persons per acre. It is recommended that the sewage from the territory north of Long street be taken west by gravity through the proposed Central Relief sewer in Long street.

SEWERAGE.

The construction of the mains for a separate system of sewers is recommended west of the Scioto, from the proposed outlet at Stimmel road and the Scioto river to Hague avenue, embracing all territory in that district which is now subdivided into lots, substantially as shown in the Alvord report.

The length of mains so recommended is 15.9 miles, and their estimated cost is $917,848.00, as shown in Table No. 7, pages 47-53 of appendix.

A report was made by this department, dated March 3, 1899, on the storm water drainage and sewerage of territory tributary to Kian Run above the point where it last crosses the corporation line, which also includes that part of the city south of Moler street not tributary to that stream.

The separate system of sewerage was recommended, and the two systems of storm water and sewerage were designed in order to show, as was necessary their relation to each other.

The design of the sewerage system on the basis of 140 gallons of sewage and sub-soil water per capita from a population of 20,000 per square mile on the tributary area, required a main sewer in Markison street, west of Fourth street of 40x60 inches.

Advantage was taken of this fact to recommend that a basin in the street grades near the intersection of Wood and Fourth streets be temporarily drained into the Sanitary sewer, and the construction of all storm water drains in this district be postponed until the need should become more urgent.

The dry flow of this sewer, it was proposed to lead into the intercepting sewer, and the excess storm water overflow into the canal by means of outlets with gates regulated by floats controlled by the rise and fall of the water running in the sewer.

The recommendations as above noted are now renewed. The sanitary mains in the district recommended for immediate construction embrace a length of 4.65 miles and are estimated to cost $73,530.00, as shown by detailed estimates in Table No. 7, pages 47-53 of appendix.

The recent decennial appraisement shows lot valuations in the territory served by each of the separate systems of sewers above named, warranting sewer construction, but as public highways are not yet opened along all of the mains as planned, it is recommended that such mains, with a few exceptions, be not built unless a free right of way for the same be granted to the city by a suitable conveyance.

It is also recommended that lots and lands within the corporate limits abutting upon these sanitary mains be assessed for sewerage facilities at a rate equal to the cost of lateral sewers including flush tanks and manholes, or in lieu of such assessments, in case it be found expedient in whole or part so to do, a tapping charge per front foot based on the cost of lateral sewers and appurtenances be fixed by ordinance of City Council and paid to the Director of Accounts, before any lots or lands are sewered into these systems.

STORM WATER DRAINS.

A number of drains for storm water only have been found necessary as follows:

An outlet into the river at Stimmel road from Renick Run sewer, the relief of undrained basins at Scott street and Hartford avenue, and at Rodgers avenue and Little Miami Railroad track, and a poorly drained basin at Broad street and Terrace avenue, also a badly drained depression at Buttles and Michigan avenues.

The first above named, 9 feet in diameter by 3529 feet in length, was recommended by Mr. Alvord, and is designed for both present and future conditions.

The second and third are short extensions of existing drains into territory north of Broad street.

The fourth with a drain of adequate size relieves the frequently flooded portion of West Broad street, and provides for

176 acres of tributary area west of the Columbus State Hospital, 40 acres of which is beyond the city limits west of Hague avenue. The tributary area further west, when necessary, can be more economically drained northwardly into Dry Run.

The last drain in the list is on the north side and leads into the Olentangy river. This group of drains have an aggregate length of 15,824 feet, and is estimated to cost $73,757.00, as shown in detail on pages 30, 44, 45 and 46 of appendix.

It will be necessary to remodel the outlets of the storm water sewers on the West Side and provide them with suitable automatic gates, as also to construct a number of cross connections recommended and shown by detail plans herewith which are estimated to cost $12,512.00.

REPAIRS TO EXISTING SEWERS

It has been known for several years that some of the older sewers were in need of substantial repairs, the defects being mainly due to settlement, wear and floods.

An inspection of such sewers has been made and the cost of necessary repairs, which have been recommended, has been estimated as follows:

Peters' Run and Blenkner street sewer	$16,033 00
Spring street sewer	10,000 00
North-West Trunk sewer	401 00
Indianola sewer	2,281 00
Joe Alley sewer	839 00
North Columbus Trunk sewer	1,165 00
Intercepting sewer	3,306 00
Total	$34,025 00

Detailed estimates are shown at pages 25, 26 and 27 of the appendix.

The work on the intercepting sewer consists of a short extension at its upper end to connect it for flushing purposes with the Olentangy river. A plan of the same showing head gate is among the exhibits accompanying the report as also more detailed statements of the proposed repairs and estimates of cost.

It is recommended that the intercepting chambers on the intercepting sewer, twenty in number, be changed and reconstructed so as to provide automatic cut-offs and regulating gates to prevent the entrance to this sewer of stones and street detritus to a much larger extent than now obtains.

The expense of cleaning existing sewers is materially greater than it should be and the work done is not thoroughly effective due to the infrequency or absence of manholes. Many excavations in public ways are now required and with the multiplication of paved roadways the expense for such openings is continually increasing.

There is no accurate record of manholes, but a count from the information tabulated on the maps shows the number to be about 1500, and catch basins about 1820, while to provide manholes in accordance with the best modern practice, at all changes of grade or direction and not exceeding 250 feet apart on the smaller sewers, 300 to 500 feet apart on the larger sewers, would require about 2000 extra manholes on public and 600 on private sewers. It can therefore hardly be considered extravagant to recommend the construction of 1000 additional manholes.

Provision should also be made for the construction of additional catch basins for which there is a steady demand, heretofore partly met by appropriations from the very inadequate sewers and drainage fund.

It is therefore recommended that new catch basins with their lead-offs be built, as needed, to the number of 500 in addition to those which have been estimated as a part of the relief sewers herein recommended.

RELIEF SEWERS.

The city, east of the Scioto and Olentangy rivers, together with the territory adjoining the corporation between these rivers and Alum creek whose area drains through any portion of the city, has been surveyed and mapped on a suitable scale, usually of 200 feet per inch, with contours platted at two foot intervals within the city and at two or five foot intervals without.

Upon these maps has been projected all of the information in existence concerning the location, size, elevation and grade of sewers. From the data thus gathered, the theoretical run-off from each drainage area has been determined by the McMath formula

of $Q. = c.\ r. \sqrt[5]{\frac{A.^4}{s.}}$ in which:

$Q.$ = Run-off in cubic feet per second.

c. = A constant for percentage of run-off according to the

pervious nature of the drainage area, being taken at .31 for rural districts, .45 for suburban districts, .62 for average city surface, and .75 for well built up and paved areas.

r.=Rainfall in inches per hour, assumed at 2.75 inches.

A.=Area in acres (determined by planimeter).

s.=Slope in feet per 1000.

The theoretical run-off so found has been compared with the capacity of existing sewers and the whole territory analyzed for each branch sewer in small and large areas, as shown by the boundary lines, and included figures on the maps which accompany this report.

Numerous places where congestion and overflow occur have thus been located. The reliability of the method employed has had many confirmations in the complaints of flooding which reached us after every heavy rain.

A record of these results has been made in tabular form and is presented herewith on pages 93 to 114 of the appendix, conveniently arranged for ready reference in Table No. 11, so that the run-off from the area drained by each sewer above the point of test and its capacity are shown as also the difference between them wherever the sewer is too small.

Numerous relief sewers have been found necessary and are shown by heavy red lines upon the accompanying maps; full and broken lines indicate the sewers recommended for immediate and future construction, respectively; sanitary sewers are similarly shown in yellow. The new relief sewers which are deemed necessary and are recommended for immediate construction are as follows:

SECOND AVENUE SEWER AND BRANCHES.

In Second Avenue, from Olentangy River to First Alley West of High Street.

In Harrison Avenue, from Second Avenue to Fourth Avenue.

In Third Avenue, from Harrison Avenue to First Alley East of Neil Avenue.

In Fourth Avenue, from Pennsylvania Avenue to First Alley East of Neil Avenue.

In Pennsylvania Avenue from Fourth Avenue to King Avenue.

In King Avenue, from Pennsylvania Avenue to Neil avenue.

In first Alley West of High Street, from Second Avenue to First Alley North of Starr Avenue.

RUSSELL STREET RELIEF SEWER AND BRANCH.

In Swan Street, from High Street to First Alley East of High Street.

In First Alley East of High Street, from Swan Street to Russell Street.

In Russell Street, from First Alley East of High Street to Park Street.

In Hubbard Avenue, from High Street to Park Street.

In Park Street, from Hubbard Avenue to Russell Street.

Across Goodale Park and in Popular Street, from Park Street to Henry Street.

CENTRAL RELIEF SEWER AND BRANCHES.

In Long Street, from Miami Avenue to First Alley East of Grant Avenue.

In Alley East of Grant Avenue, from Long Street to First Alley North of Spring.

In First Alley North of Spring Street, from Alley East of Grant Avenue to Gorman.

In Gorman Street, from Hickory street to First Alley South of Long Street.

In First Alley South of Long Street from Gorman street to Scioto River.

In Fifth Street, from First Alley North of Spring Street to a point in Goose Creek, near the Railroad tracks.

In Washington avenue, from Long Street to Grove Streeet.

In Long Street, from Fifth Street to Grant avenue.

WALNUT STREET RELIEF SEWER AND BRANCH.

In Walnut Street, from Fourth Street to Scioto Street.
In Scioto Street, from Walnut Street to Town Streeet.
In Town Street, from Scioto Street to Scioto River.
In Wall Street, from Walnut Street to Rich Streeet.

OAK STREET RELIEF SEWER.

In Oak Street, from Washington avenue to the First Alley East.

In First Alley East of Washington Avenue, from Oak Street to Franklin Avenue.

BECK STREET RELIEF SEWER AND BRANCHES.

In Beck Street from alley east of Ninth Street to Pearl Street.

In alley east of Born Street from Beck Street to Sycamore Street.

In Seventh Street from Beck Street to Livingston avenue.

In Columbus Street from Mohawk Street to first alley east of Mohawk.

In first alley east of Mohawk Street from Columbus Street to Beck Street.

The aggregate length of the relief sewers above noted is 7.85 miles, and the estimated cost of the same is $379,659.00. Details of this estimate are shown in Table No. 6, pages 28 to 46 of the appendix.

RELIEF SEWERS PROJECTED FOR FUTURE CONSTRUCTION.

The period within which the sewers projected for future construction will be needed will depend upon the rapidity of the growth in population and the multiplication of paved streets.

A part of them will be needed only after a lapse of many years. There is, however, an evident advantage in considering the problem of drainage as a whole so that the various parts of any system which shall be carried into effect, may be known to have proper and economical relations to each other.

It is also instructive to have some conception of the ultimate cost of effective relief even if the expenditures are not a present necessity.

This information is presented in Tables Nos. 9 and 10 herein, pages 55 to 92 of the appendix, which shows location, size and estimated cost of relief sewers suggested for future construction.

I desire to express my indebtedness to Mr. John W. Alvord for his comprehensive studies and published report of May 1, 1898, on the "Sewage Disposal of the City," and the "Sewerage of the West Side," and to also thank the members of the Engineering Department, whose varied and efficient services have contributed to this report. Yours respectfully,

JULIAN GRIGGS.
Engineer for the Sewer Commission.

COMPLIMENTS OF

Julian Griggs,

City Engineer.

APPENDIX

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TABLE NO. 2.

ESTIMATE OF COST OF SEWAGE PURIFICATION WORKS BY SEPTIC TREATMENT AND INTERMITTENT FILTRATION THROUGH SAND, ON THE MILLER AND SCHWENKER FARMS; TOGETHER WITH THE ESTIMATED COST OF FORCE MAIN, LIGHTING, LABORATORY AND WATER SUPPLY FOR CLEANING AND SPRINKLING.

640,543 cubic yards excavation, at 30 cents	$192,162 90
16,186 cubic yards concrete in tanks, $6.00	97,116 00
Movable weir gates and valves	1,500 00
Roofs for tanks	46,212 95
Sewage carriers	56,209 60
Gates and gate chambers	5,530 00
Lateral underdrains in filters	53,863 20
Main underdrains	24,892 69
Outlet, bulkhead and gate	750 00
Sewage distributing channels	26,496 60
Force mains from pumping station and right of way	84,961 00
Water mains and hydrants	8,723 00
Electric motors and pumps	3,000 00
Electrical transmission and lamps	6,722 00
Well and pump house	2,500 00
Laboratory building	3,000 00
Supplies for chemist	1,000 00
	$614,639 94
Add 8 per cent. for engineering, etc	49,171 06
	$663,811 00
350 acres of land, at $225.00	78,750 00
Total	$742,561 00

TABLE NO. 3.

ESTIMATED COST OF SEWAGE DISPOSAL BY THE SEPTIC TANK SYSTEM, INCLUDING ACCESSORIES AND FORCE MAIN FROM THE PUMPING STATION.

16,000 cubic yards excavation at 30 cents.....		$ 4,800 00
16,186 cubic yards cement in tank, at $6.00....		97,116 00
Movable gates and weirs		1,500 00
Roofs for tanks		46,213 00
Outlet gate and bulkhead		1,871 00
		$151,500 00
Force main $84,961 00		
Water mains and hydrants..... 3,000 00		
Electric motor and pump 1,500 00		
Electric transmission and lamps..... 5,000 00		
Well and pump house 2,500 00		
Laboratory building 3,000 00		
Supplies for chemist 1,000 00		
		100,961 00
		$221,461 00
Add 10 per cent for engineering and contingencies		25,246 00
		$277,707 00
Land		78,750 00
Total		$356,457 00

TABLE NO. 4.

PUMPING STATIONS AND FORCE MAINS—MAIN PUMPING STATION AND EQUIPMENT FOR COLUMBUS SEWAGE AND WEST SIDE STORM WATER.

Building, suction well and chimney	$12,414 00	
Pumping machinery	26,110 00	
Force main, suction pipes and valves	6,080 17	
River crossing pipes, sanitary and storm water	14,867 00	
Switch and road	10,200 00	
Land	5,000 00	
	$74,671 17	
Add 10 per cent for engineering, inspection and incidentals	7,467 11	
		$82,138 28
Estimates on Pumping Station and Force Mains for the Disposal of the Sewage of the Alum Creek District. Station on Main Street, near N. & W. Ry.:—		
Land	$ 600 00	
Building	1,600 00	
One 250,000 gallon pump and motor—Erected	725 00	
25,000 gallon covered reservoir	1,000 00	
Automatic appliances	200 00	
Interceptor and connections	300 00	
	$4,425 00	
Add 10 per cent for Engineering and Inspection	442 50	
		$4,867 50
Station on Main Street near Kelton Avenue—		
Lot	$ 1,800 00	
Building	1,800 00	
Two 2,000,000-gallon pumps and motors—Erected	2,800 00	
Automatic appliances	350 00	
300,000-gallon covered reservoir	9,580 00	
Interceptor and connections	360 00	
	$16,690 00	
Add 10 per cent for Engineering and inspection	1,669 00	
		18,359 00
Carried forward		$105,364 78

Brought forward		$105,364 78
Force Mains:—		
3246 feet 10-inch cast iron pipe, laid at $1.31	$ 4,252 26	
3918 feet 16-inch cast iron pipe, laid at $2.23	8,737 14	
449 feet 14-inch cast iron pipe, laid at $1.48	664 52	
	$13,653 92	
Add 10 per cent for Engineering and inspection	1,365 39	
		15,019 31
Grand total		$120,384 09

TABLE NO. 5.

ESTIMATED COST OF REPAIRS TO MAIN TRUNK SEWERS.

Peters, Run Sewer—Outlet:—		
Repoint with Portland cement mortar, estimated Cost	$ 20 00	
		$ 20 00
Section, from Outlet to Aqueduct:—		
1150 lineal feet 3-ring arch, at $4.80	$5,520 00	
2500 lineal feet invert plastered, cracks plugged and joints pointed, at 40 cents	1,000 00	
Four manholes, at $30.00	120 00	
100 days superintendence, at $4.00	400 00	
Add 10 per cent for contingencies	704 00	
		7,744 00
Aqueduct:—		
Should be painted, estimated cost		100 00
Carried forward		$7,864 00

Brought forward		$7,864 00
Tunnel—Section, from Station 45 to Station 49-|-80:—		
480 lineal feet sewer reconstructed, as per plan, at $14.00	$6,720 00	
One manhole	60 00	
Stone culvert in Front Street, repointed and cracks pluggged	40 00	
100 days' superintendence, at $4.00	400 00	
	$7,220 00	
Add 10 per cent for contingencies	722 00	
		$7,942 00
Steps for seventeen manholes		136 00
Summary:—		
Outlet	$ 20 00	
Outlet to Aqueduct	7,744 00	
Aqueduct	100 00	
Station 45 at the aqueduct to Station 49-|-80, at Front street	7,942 00	
Steps for seventeen manholes	136 00	
Total for Peters' Run sewer	$15,942 00	15,942 00
Blenkner Street Sewer, 315 feet east of Front Street Manhole:—		
Ninety cubic yard of excavation, at 75 cents	$ 67 50	
Tearing out old arch	10 00	
Laying 612 brick, including center, etc	13 50	
		91 00
Spring Street Sewer:—		
Renewal of invert and arch where defective		10,000 00
North-West Sewer, near Dublin Avenue:—		
266 cubic yards of excavation, refilling and sheeting, at 65 cents	$ 169 90	
Tearing out old brickwork	38 50	
13,000 bricks laid, at $12.00	156 00	
	$ 364 40	
Add 10 per cent for contingencies	36 60	
Total for North-West sewer		401 00
Carried forward		$26,434 00

Brought forward		$26,434 00
Indianola Sewer, between Station 5-|-50 and 19-|-22:—		
Reconstruction of the arch	$ 913 95	
Filling crack in the arch	468 95	
Filling and plastering over the arch	681 20	
Cleaning sewer	9 00	
	$2,073 10	
Add 10 per cent for contingencies	207 90	
		2,281 00
Joe Alley Sewer:—		
Masonry outlet	$ 670 00	
Embankment	92 50	
	$ 762 50	
Add 10 per cent for engineering and contingencies	76 50	
		839 00
North Columbus Sewer, Sub-district "I" of Sewer District No. 2:—		
Masonry outlet	$ 670 00	
Embankment	322 50	
Raising one manhole	10 00	
Plastering outer ring where washed out	15 00	
Cleaning	15 00	
	$1,032 50	
Add 10 per cent for engineering and contingencies	132 50	
		1,165 00
Intercepting Sewer:—		
120 lineal feet 30-inch brick sewer, at $5.75	$ 690 00	
210 cubic yards Portland cement concrete in outlet wall, reservoir, duct, manhole and well, at $8.00	1,680 00	
One 30-inch gate valve	415 00	
Two adjustable weirs, at $25.00	50 00	
Seventy feet right of way for sewer	50 00	
0.20 acre of ground for gate and reservoir	120 00	
	$3,005 00	
Add 10 per cent for engineering and contingencies	301 00	
		3,306 00
Grand Total		$34,025 00

TABLE No. 6—SEWERS FOR IMMEDIATE CONSTRUCTION.

ESTIMATE OF COST—SECOND AVENUE RELIEF AND BRANCHES.

Location.	From	To	Size. Ft.	Size. In.	Cut	Length	Price	Cost
King avenue	Neil avenue	Penn'a avenue	....	21	8	750	$1 10	$825 00
Pennsylvania	King avenue	Seventh avenue	....	27	12	720	1 60	1,152 00
Pennsylvania Fourth avenue	Seventh avenue Penn'a avenue	Fifth avenue Harrison ave	....	30	12	1,020	1 70	1,734 00
Fourth avenue	Forsythe avenue	Harrison avenue	....	24	10	510	1 30	663 00
Third avenue	Al. e. Neil avenue	Harrison avenue	....	24	12	670	1 50	1,005 00
Harrison avenue	Fourth avenue	Third avenue	....	33	14	670	2 10	1,407 00
Harrison avenue	Third avenue	Second avenue	....	36	14	560	2 25	1,260 00
Second avenue	Olentangy river	Hunter avenue	6	9	24	3,170	13 30	42,161 00
Second avenue	Hunter avenue	Al. w. High street	....	39	16	1,230	3 90	4,797 00
All W. of High street	Second avenue	Al. n. Starr avenue	....	33	12	580	1 85	1,073 00
Total			....	....	.....	9,880	.....	$56,077 00

Total	$56,077 00
Twelve side manholes, at $110.00	1,320 00
Twenty-three center manholes, at $50.00	1,150 00
Seventeen connections to old catch basins, at $20.00	540 00
Seventeen sewer connections, at $40.00	680 00
One Bulkhead at the river	300 00
Twenty-nine catch basins, at $60.00	1,740 00
One thousand and eighty square yards paving, at 75c	810 00
Special connection at Hunter avenue	250 00
Special connection at intercepting sewer	500 00
Total	$63,367 00
Add ten per cent. for engineering and inspection	6,337 00
Grand total	**$69,704 00**

TABLE NO. 6.—(Continued)—SEWERS FOR IMMEDIATE CONSTRUCTION.

ESTIMATE OF COST—RUSSELL STREET RELIEF AND BRANCHES.

Location.	From	To	Size		Cut	Length	Price	Cost
			Ft.	In.				
Hubbard avenue	High street	Front street	....	24	16	440	$1 90	$836 00
Front street	Hubbard avenue	Buttles avenue	....	30	18	500	2 50	1,250 00
Front street	Buttles avenue	Russell street	....	36	20	680	4 80	3,264 00
Swan street	High street	Pearl street	....	24	12	510	1 50	765 00
Pearl street	Goodale street	Russell street	....	30	16	600	2 20	1,320 00
Russell street	Front street	Center of Goodale Park	....	39	22	620	*8 20	5,084 00
Russell street	Pearl street	Front street	....	30	22	630	3 20	2,016 00
	Goodale Park	Dennison avenue	....	45	22	620	*9 50	5,890 00
Poplar avenue	Dennison avenue	Henry street	....	48	16	800	4 90	3,920 00
Total			....	....	.....	5,400	.....	$24,345 00

Total	$24,345 00
Twenty manholes, at $55.00	1,100 00
Eighteen catch basins reconnected, at $20.00	360 00
Nine new catch basins, at $60.00	540 00
Six sewer connections, at $40.00	240 00
Protection of old sewer in Pearl street and repaving, 1,100 feet	550 00
Protection of electric ducts and poles	500 00
Total	$27,635 00
Add ten per cent. for engineering and inspection	2,765 00
Grand total	$30,400 00

*Tunnel.

TABLE NO. 6.—(Continued)—SEWERS FOR IMMEDIATE CONSTRUCTION.

ESTIMATE OF COST– FACTORY STREET STORM WATER DRAIN.

Location.	From	To	Size Ft.	Size In.	Cut	Length Ft.	Price	Cost
Buttles avenue	Michigan avenue	A point in Factory street 100 ft. n. of Buttles ave.	....	30	14	350	$2 00	$700 00
North of Buttles ave.	Factory street	Olentangy river	....	36	16	580	4 00	2,320 00
Total	.....	....	....	....	.....	930	.....	$3,020 00

Total	$3,020 00
Four manholes, at $50.00	200 00
Four catch basins, at $60.00	240 00
Four old catch basins, reconnected, at $20.00	80 00
Repaving Buttles avenue	200 00
One bulkhead	150 00
Total	$3,890 00
Add ten per cent. for enginering and inspection	389 00
Grand total	$4,279 00

NORTHWEST SEWER DISTRICT.

Summary of Sewers for Immediate Construction, Located North of Railroad Tracks and Union Station.

Sewers.	Manholes.	Catch Basins.	Length of Sewer.—Ft.	Cost of Sewer.
Second avenue relief	19	17	5,080	$57,663 00
Harrison avenue relief	16	12	4,900	12,041 00
Russell street relief	20	9	5,400	30,400 00
Factory street storm drain	4	4	930	4,279 00
Totals	59	42	16,210	$104,383 00

TABLE NO. 6.—(Continued)—SEWERS FOR IMMEDIATE CONSTRUCTION.

ESTIMATE OF COST—CENTRAL RELIEF SEWER.

Location.	From.	To	Size Ft.	Size In.	Cut	Length Ft.	Price	Cost
Long street	Miami avenue	Monroe avenue	4	9	19.3	1,020	$6 60	$6,732 00
Long street	Monroe avenue	Hamilton avenue	5	6	22.5	495	8 35	4,133 25
Long street	Hamilton avenue	Lexington avenue	5	9	22.7	850	8 65	7,352 50
Long street	Lexington avenue	Washington avenue	5	6	19.4	1,200	7 10	8,520 00
Long street	Washington avenue	Kelly alley	5	6	18.5	1,555	7 10	11,040 50
Kelly alley	Long street	Church alley						
Church and McKee al.	Kelly alley	Sixth street	6	6	20.5	505	8 75	4,418 75
McKee alley	Sixth street	Fifth street	6	9	20.0	710	9 25	6,567 50
McKee and Hickory	Fifth street	Third street	9	....	26.7	985	20 30	19,995 50
Hickory street	Third street	Pearl street	9	6	24.5	495	19 70	9,751 50
Hickory street	Pearl street	Gorman street	9	9	23.4	1,715	19 80	33,957 00
Gorman street	Hickory street	Spring street						
Gorman street	Spring street	Elm street	10	6	15.0	1,070	17 25	18,457 50
Elm street	Gorman street	Scioto river						
Total			....	....	.....	11,095	.....	$130,926 00

Total	$130,926 00
Sixteen catch basins, at $60.00	960 00
Twenty-eight manholes, at $110.00	3,080 00
Fifteen large brick sewer connections, at $160.00	2,400 00
Five thousand seven hundred and twenty-five sq. yards repaving, at $1.50	8,587 50
Ninety house junctions reconnected, at $5.00	450 00
Relaying gas and water pipes	5,700 00
Five special drops (extra cost above cost of manholes)	275 00
Masonry outlet at river	731 50
Total	$153,110 00
Add ten per cent. for engineering and inspection	15,311 00
Grand total	$168,421 00

TABLE NO. 6.—(Continued)—SEWERS FOR IMMEDIATE CONSTRUCTION.

ESTIMATE OF COST—FIFTH STREET BRANCH.

Location.	From.	To	Size Ft.	Size In.	Cut	Length Ft.	Price	Cost
R. R. yards & Fifth st..	A point in Goose creek..	Buckingham street	6	....	20	1,390	$7 90	$10,981 00
Fifth street	Buckingham street.....	Naghten street	6	6	27	1,345	11 20	15,064 00
Fifth street	Naghten street.....	McKee alley	7	....	29	1,535	12 75	6,821 25
Total	.....	....	....	....	.....	4,270	.....	$32,866 25

Total	$32,866 25
Six catch basins, at $60.00.....	360 00
Five manholes, at $110.00	550 00
Masonry inlet	100 00
Six hundred and twenty-five square yards repaving, at $1.50.....	937 50
Twenty-two house connections for reconnection, at $5.00.....	110 00
One thousand eight hundred and thirty-five feet of water pipe relaid, at 70c.....	1,284 50
One thousand eight hundred and thirty-five feet of gas pipe relaid, at 30c.....	550 00
Total	$36,758 25
Add ten per cent. for engineering and inspection.....	3,675 75
Grand total	$40,434 00

TABLE NO. 6.—(Continued)—SEWERS FOR IMMEDIATE CONSTRUCTION.

ESTIMATE OF COST—LONG STREET EXTENSION.

Location.	From	To	Size Ft.	Size In	Cut	Length Ft.	Price	Cost
Long street	Grant avenue	Fifth street	....	24	18	920	$3 10	$2,852 00

Total	$2,852 00
Three manholes, at $50.00	150 00
Five hundred and sixteen square yards paving, at $1.50	774 00
Two catch basins, at $60.00	120 00
Total	$3,896 00
Add ten per cent. for engineering and inspection	389 00
Grand total	$4,285 00

TABLE NO. 6.—(Continued)—SEWERS FOR IMMEDIATE CONSTRUCTION.

ESTIMATE OF COST—WASHINGTON STREET RELIEF.

Location.	From.	To	Size Ft.	Size In	Cut	Length Ft.	Price	Cost
Washington avenue	Grove street	Mt. Vernon avenue	....	33	18	450	$4 10	$1,845 00
Washington avenue	Mt. Vernon ave	Long street	....	48	22	1,110	6 33	7,026 30
Total			....	....	.....	1,560	.....	$8,871 30

Total	$8,871 30
Six manholes, at $50.00	300 00
Four catch basins, at $60.00	240 00
One thousand five hundred and sixty feet, provision for flow of sewage, at 25c	390 00
One sewer connection	25 00
One thousand one hundred and twenty square yards repaving asphalt, at $2.50	2,800 00
Sixty-two house connections for reconnection, at $5.00	310 00
Total	$12,936 30
Add ten per cent. for engineering and inspection	1,293 70
Grand total	$14,230 00

TABLE NO. 6.—(Continued)—SEWERS FOR IMMEDIATE CONSTRUCTION.

Summary of Estimates for Sewers for Immediate Construction in the Central Relief Sewer District.

Sewer	Manholes	Catch Basin	Length of Sewer—Ft	Cost of Sewer
Central relief	28	16	11,095	$168,421 00
Fifth street branch	5	6	3,270	40,434 00
Long street extension	3	2	920	4,285 00
Washington street relief	6	4	1,560	14,230 00
Totals	42	28	16,845	$227,370 00

TABLE NO. 6.—(Continued)—SEWERS FOR IMMEDIATE CONSTRUCTION.

WALNUT STREET RELIEF SEWER.

Location.	From.	To	Size. Ft.	Size. In.	Cut	Length Ft.	Price	Cost
Walnut street	Fourth street	Wall street	....	66	22	1,510	$8 00	$12,080 00
Walnut street	Wall street	Scioto street	....	54	14	920	4 90	4,508 00
Scioto street	Wall street	Town street						
Town street	Scioto street	Scioto river						
Total			....	....	.....	2,430	.....	$16,588 00

Total	$16,588 00
Six manholes at side of sewer, at $110.00	660 00
Five catch basins, at $60.00	300 00
Special connection at Fourth street	250 00
Extra cost of tunneling under market house	200 00
Cost of drop manholes	500 00
Cost of bulkhead of stone at river	100 00
Connection at intercepting sewer	200 00
One thousand two hundred and twenty square yards of paving, relaid, at 75c	915 00
Total	$19,713 00
Add ten per cent. for engineering and inspection	1,972 00
Grand total	$21,685 00

TABLE NO. 6.—(Continued)—SEWERS FOR IMMEDIATE CONSTRUCTION.

ESTIMATE OF COST—WALL STREET BRANCH.

Location.	From	To	Size Ft.	Size In.	Cut	Length Ft.	Price	Cost
Wall street	Rich street	Walnut street		36	16	260	$3 80	$988 00

Total	$988 00
Three manholes, at $55.00	165 00
Connection at Rich street	200 00
One hundred and ninety-three square yards repaving on Wall street, at 90c	174 00
Total	$1,527 00
Add ten per cent for engineering and inspection	153 00
Grand total	$1,680 00
Total for Walnut and Wall street sewers	$23,365 00

TABLE NO. 6.—(Continued)—SEWERS FOR IMMEDIATE CONSTRUCTION.

ESTIMATE OF COST—BECK STREET RELIEF SEWER.

Location.	From	To	Size Ft.	Size In.	Cut	Length Ft.	Price	Cost
Beck street	Third street	Al. w. Fifth street		63	16	1,140	$6 10	$6,954 00
Beck street	Al. w. Fifth street	Seventh street		51	16	1,070	5 10	5,457 00
Beck street	Seventh street	Al. e. Seventh street		39	8	90	1 60	144 00
Beck street	Al. e. Seventh street	Al. e. Corzilius		24	9	880	1 20	1,056 00
Total						3,180		$13,611 00

Total	$13,611 00
Eight side manholes, at $110.00	880 00
Five center manholes, at $55.00	275 00
Six catch basins, at $60.00	360 00
Extra cost of providing for flow of old sewer during construction, 2,400 feet, at 35c	600 00
Two hundred and forty-seven square yards repaving on Beck street, at 90c	222 00
Connection at Third street	100 00
Total	$16,048 00
Add ten per cent. for engineering and inspection	1,605 00
Grand total	$17,653 00

TABLE NO. 6.—(Continued)—SEWERS FOR IMMEDIATE CONSTRUCTION.

ESTIMATE OF COST—BRANCH SEWERS TO BECK STREET RELIEF SEWER.

Location.	From	To	Size Ft.	Size In.	Cut	Length Ft.	Price	Cost
Seventh street	Beck street.....	Livingston avenue	....	36	15	700	$2 40	$1,680 00

Total	$1,680 00
Two manholes, at $55.00.....	110 00
One connection to sewer, at $25.00.....	25 00
One catch basin	60 00
Four hundred and twenty-eight sq. yards repaving on Seventh street, at 90c.....	385 00
Four hundred feet providing for flow in old sewer, at 25c.....	100 00
Amount carried forward	$2,360 00

TABLE NO. 6.—(Continued)—SEWERS FOR IMMEDIATE CONSTRUCTION.

BRANCHES TO BECK STREET RELIEF SEWER—(Concluded.)

Location.	From.	To	Size Ft.	Size In.	Cut	Length Ft.	Price	Cost
Amount carried forward	.....	.....	....	....	.....	.....	.....	$2,360 00
All east of Born street..	Beck street.....	Sycamore street	....	36	16	570	$2 60	$1,482 00
Total	.....	....	....	....	.....	.....	.....	$3,842 00

Total of items above.....	$3,842 00
Two manholes, at $55.00.....	110 00
One sewer connection	25 00
Four hundred and twenty feet, providing for flow in old sewer, at 25c.....	105 00

All east of Mohawk st Columbus street	Beck street..... Mohawk street.....	Columbus street ..... Al. e. Mohawk.....	....	42	14	1,710	$2 50	$4,275 00

Total	$4,275 00
Six manholes, at $55.00.....	330 00
One catch basin	60 00
One sewer connection	25 00
Four hundred and sixty feet, providing for flow in old sewer, at 25c.....	115 00
Total for branches	$8,887 00
Add ten per cent. for engineering and inspection.....	888 00
Grand total	$9,775 00
Total for Beck street system.....	$27,428 00

TABLE NO. 6.—(Continued)—SEWERS FOR IMMEDIATE CONSTRUCTION.

OAK STREET EXTENSION.

Location.	From	To	Size Ft.	Size In.	Cut	Length Ft.	Price	Cost
Al. east Washington av. Oak street	Franklin avenue..... Al. e. Washington.....	Oak street ..... Washington avenue.....	....	33	12	470	$1 85	$869 50

Total	$869 50
One manhole	55 00
Two old manholes repaired.....	20 00
Ninety-two square yards paving relaid.....	83 00
Two catch basins, at $60.00.....	120 00
Four hundred and seventy feet, providing for the flow in old sewer, at 25c.....	117 50
Total	$1,265 00
Add ten per cent. for engineering and inspection.....	127 00
Grand total	$1,392 00

TABLE NO. 6.—(Continued)—SEWERS FOR IMMEDIATE CONSTRUCTION.

Summary of Sewers for Immediate Construction in Peters' Run District.

Sewers	Manholes	Catch Basin	Length of Sewer—Ft.	Cost of Sewer
Walnut street relief	6	5	2,430	$21,685 00
Wall street branch	3	.....	260	1,680 00
Beck street relief	13	6	3,180	17,653 00
Seventh street branch	2	1	700	2,360 00
Alley east Born street branch	2	.....	570	1,900 00
Alley east Mohawk street branch	6	1	1,710	5,515 00
Oak street extension	1	2	470	1,392 00
Totals	33	15	9,320	$52,185 00

TABLE NO. 6.—(Continued)—SEWERS FOR IMMEDIATE CONSTRUCTION.

ESTIMATE OF COST—WEST BROAD STREET STORM WATER DRAIN.

Location.	From	To	Size Ft.	Size In.	Cut	Length Ft.	Price	Cost
Broad street	Hague avenue	Warren avenue	....	24	8	630	$1 10	$693 00
Broad street	Warren avenue	N. Burgess avenue	....	30	8	750	1 30	975 00
Broad street	N. Burgess ave	Colebrooke street	....	39	8	400	1 60	640 00
Broad street	Colebrook street	Eldon avenue	....	42	8	370	2 40	888 00
Eldon avenue	Broad street	Grace street	....	45	12	860	3 90	3,354 00
Eldon avenue	Grace street	Steele avenue	....	51	10	480	4 00	1,920 00
Broad street	N. Oakley avenue	Park avenue	....	20	8	280	1 05	294 00
Broad street	Park avenue	Eureka avenue	....	24	8	360	1 10	396 00
Broad street	Eureka avenue	Eldon avenue	....	30	8	360	1 30	468 00
Grace street	Hague avenue	Al. e. Harris	....	24	10	610	1 20	732 00
Grace street	Al. e. Harris	Al. w. Burgess	....	30	8	630	1 30	819 00
Grace street	Al. w. Burgess	Colebrook street	....	33	8	600	1 40	840 00
Grace street	Colebrook street	Eldon avenue	....	36	8	360	2 80	1,008 00
Total			....	....	.....	.....	.....	$13,027 00

Total	$13,027 00
Sixty-nine catch basins, at $60.00	4,140 00
Twenty-two manholes, at $50.00	1,100 00
Two special catch basins, at $100.00	200 00
Twenty cubic yards masonry bulkhead at Allen avenue, at $4.00	80 00
Two hundred and fifty feet of ditching, at $1.00	250 00
Two thousand nine hundred sq. yards pavement relaid on Broad street, at 75c	2,175 00
Total	$20,972 00
Add ten per cent. for engineering and inspection	2,098 00
Grand total	$23,070 00

TABLE NO. 6.—(Continued)—SEWERS FOR IMMEDIATE CONSTRUCTION.

ESTIMATE OF COST—GLENWOOD AVENUE STORM DRAIN.

Location.	From.	To	Size		Cut	Length Ft.	Price	Cost
			Ft.	In.				
Glenwood avenue Harrison avenue Al. west of Rodgers Al. south L. M. R. R.	Scott street Glenwood avenue Harrison avenue Al. w. Rodgers	Harrison avenue Al. w. Rodgers Al. s. L. M. R. R Rodgers avenue	....	15	8	1,455	$0 90	$1,309 50

Total	$1,309 50
Seven manholes, at $50.00	350 00
Five catch basins, at $60.00	300 00
Total	$1,959 50
Add ten per cent. for engineering and inspection	195 50
Grand total	$2,155 00

TABLE NO. 6.—(Concluded)—SEWERS FOR IMMEDIATE CONSTRUCTION.

ESTIMATE OF COST—HARTFORD AVENUE STORM DRAIN.

Location.	From.	To	Size Ft.	Size In.	Cut	Length Ft.	Price	Cost
Hartford avenue..... Broad street	Scott street..... Hartford avenue.....	Broad street ..... Hawkes avenue	....	15	8	1,120	$0 90	$1,008 00

Total	$1,008 00
Five manholes, at $50.00.....	250 00
Four catch basins, at $60.00.....	240 00
Two hundred and ten square yards repaving, at 75c.....	157 50
Total	$1,655 50
Add ten per cent for engineering and inspection.....	165 50
Grand total	$1,821 00

ESTIMATE OF COST—STIMMEL ROAD STORM DRAIN.

Location.	From.	To	Size Ft.	Size In.	Cut	Length Ft.	Price	Cost
Stimmel road	Renick run.....	Scioto river	9	....	12.2	3,529	$12 10	$42,619 00

Total	$42,619 00
Five manholes, at $100.00.....	500 00
Total	$43,119 00
Add ten per cent. for engincering and inspection.....	4,312 00
Grand total	$47,431 00

TABLE NO. 7.—SANITARY SEWERS FOR IMMEDIATE CONSTRUCTION.

Estimate of Cost of Main Sanitary Sewers Recommended for Immediate Construction, West of the Scioto River.

Location.	From	To	Size Ft.	Size In.	Depth Feet	Length Feet	No. Man-holes	Total Cost
Stimmel road	River	Jackson pike	....	42	13.0	2,965	8	$12,612 00
Jackson pike	Stimmel road	North	....	36	12.2	1,700	4	5,849 61
Jackson pike	Stimmel road	North	....	36	25.0	1,100	.....	9,195 21
Jackson pike	Stimmel road	North	....	36	22.0	600	.....	4,168 29
Jackson pike	Stimmel road	North	....	36	17.7	900	.....	4,738 25
Jackson pike	Stimmel road	North	....	36	14.8	1,348	13	5,967 21
2nd alley w. of Sandusky	Harrisburg pike	1st al. s. of Sullivant ave	....	36	13.0	1,540	.....	5,933 27
1st al. s. of Sullivant av.	2nd al. w. of Sandusky	1st al. e. of Hawkes ave	....	36	15.5	612	9	2,767 12
1st al. s. of Sullivant av.	1st al. e. of Hawkes ave.	Hawkes avenue	....	36	12.6	405	1	1,523 24
Hawkes avenue	1st al. s. of Sullivant ave.	Sullivant avenue	....	36	11.8	148	1	503 45
Sullivant avenue	Hawkes ave	1st al. w. B. & O. Ry	....	36	10.4	1,897	9	6,221 79
Sullivant avenue	1st al. w. of B. & O. Ry.	1st al. w. W. Park avenue	....	36	10.4	438	2	985 54
1st alley w. of Yale ave.	Sullivant ave	Town street	....	27	11.1	1,292	8	3,294 30
Town street	1st al. w. of Yale ave	1st al. w. W. Park avenue	....	27	12.0	427.5	2	1,019 06
1st al. w. of W. Park av.	Town street	1st al. s. of Broad street	....	27	12.5	1,076.2	4	2,907 02
1st al. s. of Broad st	1st al. w. of W. Park ave	Princeton avenue	....	27	11.9	151.8	1	399 43
Princeton avenue	1st al. s. of Broad street.	Broad street s. of curb line	....	27	12.0	150.0	1	483 93
Broad street	Princeton ave on south.	Princeton ave. on north	....	27	13.4	267.5	1	823 58
Princeton avenue	Broad street, n. line of.	1st al. n. of Broad street	....	27	13.5	150.0	1	378 33
1st al. n. of Broad st	Princeton ave	1st al. w. of Hayden ave	....	27	13.3	556.0	3	1,552 05
1st al. n. of Broad st	1st al. w. of Hayden ave.	1st al. w. of Central ave	....	18	12.7	408.5	3	487 54
Davis Avenue	1st al. s. of Sullivant ave.	Town street	....	24	11.4	1,190.0	6	2,573 75
Town street	Davis avenue	Richard avenue	....	20	10.6	545.0	3	651 44
Richard avenue	Town street	1st al. s. of Broad street	....	18	9.5	1,090.0	6	951 10
Richard avenue	1st al. s. of Broad street.	Broad street	....	15	12.1	160.0	1	147 70
Broad street	Richard avenue	Hartford avenue	....	15	13.0	100.0	1	136 18
		Carried forward	....	....	.....	.....	.....	$76,270 39

TABLE NO. 7.—(Continued)—SANITARY SEWERS FOR IMMEDIATE CONSTRUCTION.

Location.	From	To	Size Ft.	Size In.	Depth Ft.	Length Ft.	No. Man Holes	Total Cost
		Brought forward	....	....	.....	.....	.....	$76,270 39
Hartford avenue	Broad street	Scott street	....	15	10.9	475.0	2	413 34
Scott street	Hartford avenue	Darby street	....	12	9.9	417.7	2	270 43
Darby street	Scott street	River street	....	12	10.5	524.0	2	406 66
River street	Darby street	Davis avenue	....	12	15.4	165.0	1	197 59
1st al. n. of Broad st	Hartford avenue	1st al. e. of Glenwood ave	....	10	8.1	1,747.0	12	1,004 70
Davis avenue	Town street	1st al. n. of Town street	....	20	12.0	185.0	1	234 82
1st al. n. of Town st	Davis avenue	Green alley	....	20	13.3	368.5	17	593 12
Green alley	1st al. n. of Town street	Chapel street	....	20	13.2	66.5	1	103 74
Chapel street	Green alley	Mill street	....	20	13.4	1,490.0	8	2,083 26
Mill street	Chapel st. on West Side	Chapel street on east side	....	20	10.0	50.0	1	56 76
Chapel street	Mill street	Mitchell street	....	18	9.2	2,133.0	10	1,868 68
Town street	Richard avenue	1st al. e. of Hawkes ave	....	12	10.4	458.0	3	368 57
Town street	1st al. e. of Hawkes ave	Dakota avenue	....	10	7.9	842.0	3	496 82
Town street	Dakota avenue	1st al. w. of Yale avenue	....	10	9.4	1,220.0	6	849 00
Sullivant avenue	1st al. w. of W. Park ave	Dana street	....	27	10.1	489.0	2	1,445 66
Sullivant avenue	Dana street	Walters street	....	24	14.9	1,250.0	7	3,424 77
Sullivant avenue	Walters street	Station 183	....	20	12.2	1,573.0	8	5,488 53
Sullivant avenue	Station 183	1st al. w. of Oakley ave	{	24	14.3	2,805.0	29	21,840 78
			{	24	18.4	2,595.0		
Sullivant avenue	Station 242	Ogden avenue	....	18	13.8	1,672.0	10	2,545 02
Sullivant avenue	1st al. w. of Oakley ave	Station 242	....	18	13.8	500.0	3	752 80
Town street	1st al. w. of W. Park ave	Central avenue	....	10	9.6	1,145.0	6	818 87
Green alley	Chapel street	1st al. s. of Broad street	....	8	7.8	858.0	5	542 83
1st al s. of Thomas ave, 1st al w. of Sandusky st, Thomas and Bank sts.	2nd al. w. of Sandusky st	Gift street	....	10	8.7	1,044.0	10	1,100 56
Gift street	Bank street	Noble alley	....	8	5.0*	220.0	.....	.....
		Noble alley	....	....	6.5!	330.0	3	315 50
		Carried forward	....	....	.....	.....	.....	$123,493 20

(!) indicates "fill."
Note.—(*) indicates "cut."

TABLE NO. 7.—(Continued)—SANITARY SEWERS FOR IMMEDIATE CONSTRUCTION.

Location.	From	To	Size Ft.	Size In	Depth Ft.	Length Ft.	No. Man Ho'es	Total Cost
		Brought forward	....	....	.....	.....	.....	$123,493 20
Belle street	Chapel street	Kimball street	....	10	8.1	1,413.0	7	1,180 01
Belle street	Chapel street	Rich street	....	8	6.0	732.0	3	373 43
Town street	Belle street	Center street	....	8	6.0	784.0	4	410 85
Mill street	Chapel street	1st al. n. of Town street	....	8	9.8	65.0	1	44 86
1st al. n. of Town st	Mill street	1st al. w. of McDowell st	....	8	9.6	368.0	2	254 07
1st al. w. of McDowell st.	1st al. n. of Town street	Rich street	....	8	7.1	632.0	4	341 33
Glenwood ave	Sullivant ave	1st al. n. of Harrisburg pike	....	15	6.0	2,580.0	16	1,787 41
1st al. n. of Harrisb'g p'k	Glenwood ave	Central avenue	....	12	12.8	966.0	7	1,057 00
Lucas street	1st al. n. of Main street	Chapel street	....	8	7.4	1,070.0	5	608 85
Mill street	Chapel alley	1st al. n. of Chapel street	....	8	10.0	102.0	1	77 26
1st al. n. of Chapel st	Mill street	1st al. e. of Mill street	....	8	10.3	230.0	1	170 81
1st al. e. of Mill st	1st al. n. of Chapel street	State street	....	8	9.5	145.0	1	134 31
State street	1st al. e. of Mill street	1st al. w. of McDowell st	....	8	8.8	115.0	1	137 98
1st al. w. of McDowell st	State street	1st al. n. of State street	....	8	7.5	165.0	1	118 32
1st al. n. of Broad st	1st al. w. of Central ave.	Schultz street	....	18	11.2	951.5	6	1,361 21
Schultz street	1st al. n. of Broad street	Broad street	....	18	11.0	159.5	1	209 88
Broad street	Schultz street	Tatnick boulevard	....	18	13.6	1,000.0	6	2.319 35
1st al. w. of Hayden av.	1st al. n. of Broad street	P., C., C. & St. L. Ry	....	20	12.0	1,404.0	7	2,326 65
P., C., C. & St. L. Ry. right of way	1st al w. of Hayden ave.	Central avenue	....	20	13.0	191.0	1	321 86
Central ave	P., C., C. & St. L. Ry	Stone Quarry pike	....	20	13.7	587.0	3	1,029 29
Stone Quarry pike	Central avenue	Dry Run	....	20	13.6	2,678.0	13	4,699 04
Asylum Grounds	Stone Quarry pike	.....	....	15	10.0	5,600.0	32	7,821 44
Asylum Grounds	.....	Steele avenue	....	12	10.0	1,300.0	.....	1,021 02
Eldon avenue	Asylum Grounds	Broad street	....	12	13.0	1,340.0	6	1.351 73
Tatnick boulevard	Broad street	Superior boulevard	....	12	13.0	810.0	4	816 64
Tatnick boulevard	Superior street	Columbian avenue	....	10	13.0	650.0	4	627 77
Columbian ave	Tatnick boulevard	1st al. s. of Floral avenue	....	18	13.0	200.0	1	199 76
		Carried forward	....	....	.....	.....	.....	$154,295 33

TABLE NO. 7.—(Continued)—SANITARY SEWERS FOR IMMEDIATE CONSTRUCTION.

Location.	From	To	Size Ft.	Size In	Depth Ft.	Length Ft.	No. Man Holes	Total Cost
		Brought forward	....	....	.....	.....	.....	$154,295 33
1st al. s. of Floral av	Columbian avenue	1st al. w. of Lechner ave	....	8	13.0	850.0	2	783 53
Broad street	Elden avenue	Colebrook street	....	12	14.0	140.0	1	218 99
Terrace street	Broad street	1st al. s. of Broad street	....	10	14.0	190.0	4	182 60
1st al. s. of Broad st	Terrace street	1st al. w. of Warren ave	....	10	12.0	1,580.0	10	1,324 [illegible]
Steele ave	Eldon avenue	Oakley avenue	....	10	10.7	1,000.0	4	781 00
Grace street	Eldon avenue	1st al. w. of Burgess ave	....	8	12.0	950.0	4	754 27
Broad street	Eldon avenue	1st al. w. of Stanley ave	....	10	10.0	560.0	2	690 52
1st al. w. of Oakley ave	Broad street	1st al. s. of Broad street	....	10	10.0	170.0	1	114 70
1st al. w. of Oakley ave	Sullivant avenue	Logan street	....	15	12.0	1,230.0	4	1,283 37
Private land	1st al, w. of Oakley ave at Logan street	Line of 1st al. e. of Terrace	....	15	11.0	700.0	3	645 26
Private land	Line of 1st al. e. of Terrace street	Line of 1st al. e. of Burgess	....	12	11.0	680.0	4	567 16
Superior boulevard	Tatnick boulevard	1st al. s. of Broad st	....	8	12.0	990.0	4	858 33
1st al. s. of Broad st	Superior boulevard	1st al. e. of Kadina ave	....	8	12.0	2,360.0	14	2,382 10
Total	.....	.....	....	....	.....	83,940.2	.....	$164,881 26

Total	$164,881 26
Four hundred and twenty-eight manholes, at $35.00	14,980 00
Total	$179,861 26
Add ten per cent. for engineering and incidentals	17,986 74
Grand total	$197,848 00

TABLE NO. 7.—(Continued)—SANITARY SEWERS FOR IMMEDIATE CONSTRUCTION.

Estimate of Cost of Sanitary Sewers in Sub-District "K."

Location.	From	To	Size Ft.	Size In.	Cut	Length Ft.	Price	Cost
Heyl avenue	Al. n. Schiller	Alley n. Reinhard	....	10	12	300	$0 82	$246 00
Heyl avenue	Al. n. Reinhard	Alley n. Thurman	....	10	13	2,250	90	2,025 00
Al. n. of Thurman	Heyl avenue	Alley e. Ann street						
Al. n. of Thurman	Al. e. Ann street	Alley e. Parsons	....	10	14	670	96	643 20
Al. e. of Parsons	Al. n. Thurman	Alley n. Merion	....	12	11	1,470	86	1,264 20
Al. e. of Parsons	Al. n. Merion	Alley e. Parsons	....	15	12	605	92	556 60
Moler street	Parsons avenue	Moler street						
Total	.....	.....	....	....	.....	5,295	.....	$4,735 00

Total	$4,735 00
Twenty-seven manholes, at $50.00	1,350 00
Extra for C. I. pipe crossings	100 00
Total	$6,185 00
Add ten per cent. for engineering and inspection	618 00
Grand total	$6,803 00

TABLE NO. 7.—(Continued)—SANITARY SEWERS FOR IMMEDIATE CONSTRUCTION.

Estimate of Cost of Sanitary Mains, South of Moler Street and West of East Corporation Line.

Location.	From.	To	Size. Ft.	Size. In.	Cut	Length Ft.	Price	Cost
Markison ave	T. & O. C. Ry	Fourth street	40-60		22	1,270	$6 50	$8,255 00
Fourth street	Markinson ave	Al. s. of Innis	30-45		20	2,020	5 00	10,100 00
Al. s. of Innis	Fourth street	Sixth street	30-45		18	700	4 60	3,220 00
Sixth st. and al	Al. s. of Innis	North of Hosack	30-45		12	2,960	3 70	10,952 00
Al. n. of Hosack	Sixth street	Al. e. Parsons						
Markison ave	Fourth street	Al. w. Seventh street	24	36	14	850	3 20	2,720 00
Markison ave	Al. w. Seventh street	E. corporation line	....	24	14	1,870	2 80	5,236 00
Seventh street	Mithoff street	Al. s. Moler street	....	10	12	1,430	82	1,172 60
Al. s. Moler st	Seventh street	Al. w. Sixth street	....	12	12	1,760	92	1,619 20
Al. w. Sixth st	Al. s. Moler street	Markison avenue						
Al. e. Parsons	Markison ave	Moler street	....	18	12	1,385	1 35	1,869 75
Al. n. of Innis	Al. e. Sixth street	Fourth street	....	10	12	1,580	82	1,295 60
Eighth street	Merritt street	Al. n. Hosack street	....	8	10	450	60	270 00
Sixth street	Merritt street	Al. n. Hosack street	....	10	12	450	82	369 00
Fourth street	Al. s. Barthman	Al. s. of Innis	....	10	12	685	82	561 70
Innis and al. n	Al. w. High street	Fourth street	....	10	12	990	82	811 80
Between T. & O. C. Ry and canal	.....	.....	....	24	18	225	5 50	1,237 50
Between T. & O. C. Ry and canal	.....	.....	....	24	6	400	4 30	1,720 00
Between T. & O. C. Ry and canal	.....	.....	....	24	6	250	4 30	1,075 00
Total	.....	.....	....	....	.....	19,275	.....	$52,485 15

TABLE NO. 7.—(Continued)—SANITARY SEWERS FOR IMMEDIATE CONSTRUCTION.

Total	$52,485 15
Seventy-seven manholes, at $50.00	3,850 00
One hundred and eighty square yards paving, at 75c	135 00
Fifty catch basins, at $60.00	3,000 00
Screen chamber	200 00
Receiving manhole	100 00
Intercepting chamber	450 00
Forty cubic yards for parapet wall at outlet, at $6.00	240 00
Extra for crossings of storm water drains	200 00
Total	$60,660 15
Add ten per cent. for engineering and inspection	6,066 85
Grand total	$66,727 00

TABLE NO. 8.

Final Summary of Sewers for Immediate Construction.

Sewer District	Manholes	Catch Basins	Length of Sewer, Ft.	Cost of Sewer
Northwest, Poe alley and North Columbus	59	42	16,210	$104,383 00
Central relief	42	28	16,845	227,370 00
Peters' run, Moler street and Alum creek	33	15	9,320	52,185 00
West Broad street	22	71	6,690	23,070 00
Glenwood avenue	7	5	1,455	2,155 00
Hartford avenue	5	4	1,120	1,821 00
Stimmel road storm drain	5	.....	3,529	47,431 00
Sanitary sewers west of the river	428	.....	83,940	197,835 00
Sub-district "K" sanitary sewers	27	.....	5,295	6,803 00
Kian run (Moler street district) sanitary	77	50	19,275	66,727 00
Totals	705	215	163,679	$729,781 00

Length of storm drains ..... 13,724 ft.— 2.60 miles.
Length of combined sewers ..... 41,445 ft.— 7.86 miles.
Length of sanitary sewers ..... 108,510 ft.—20.55 miles.

Total legth of sewers and drains ..... 163,679 ft.—31.0 miles.

TABLE NO. 9.—SEWERS FOR FUTURE CONSTRUCTION.

Estimated Cost Hudson Street Relief Sewer.

Location.	From.	To	Size. Ft.	Size. In.	Cut	Length Ft.	Price	Cost
Terrace avenue	Duncan street	Hudson street	....	18	8	400	$1 05	$420 00
Tompkins street	Deming avenue	Medary avenue	....	24	8	470	1 10	517 00
Medary avenue	Tompkins street	Hudson street	....	27	10	370	1 40	518 00
Adams avenue	Duncan street	Hudson street	....	24	8	410	1 10	451 00
Clinton street	Deming avenue	Medary avenue	....	24	8	350	1 10	385 00
Clinton street	Medary avenue	Findlay avenue	....	27	10	870	1 40	1,218 00
Findlay avenue	Clinton street	Hudson street	....	36	10	780	1 70	1,326 00
Hudson street	Deming avenue	Medary avenue	....	24	8	320	1 10	352 00
Hudson street	Medary avenue	Findlay avenue	....	30	10	1,120	1 50	1,680 00
Hudson street	Findlay avenue	High street	....	36	12	800	2 00	1,600 00
Hudson street	High street	Al. w. Neil avenue	....	42	tun.	980	9 00	8,820 00
Hudson street	Al. w. Neil ave	Olentangy river	....	48	.8	530	3 60	1,908 00
Total			....	....	.....	7,400	.....	$19,195 00

Total	$19,195 00
Twenty-two manholes, at $50.00	1,100 00
Thirty-six catch basins, at $60.00	2,160 00
Bulkhead at the river	250 00
Four connections to old catch basins, at $20.00	80 00
Fifty-three square yards repaving, at 75c	40 00
Total	$22,825 00
Add ten per cent. for engineering and inspection	2,282 00
Grand total	$25,107 00

TABLE NO. 9.—(Continued)—SEWERS FOR FUTURE CONSTRUCTION.
Estimate of Cost—Poe Alley Relief and Branches.

Location.	From	To	Size Ft.	Size In.	Cut	Length Ft.	Price	Cost
Adams avenue	Maynard avenue	Knickerbocker	....	18	8	330	$1 10	$363 00
Knickerbocker Al. w. Adams ave	Adams avenue Knickerbocker	Al. w. Adams ave Al. n. Northwood	....	24	8	720	1 10	792 00
Al. n. Northwood	Al. w. Dayton	Al. w. Adams avenue	....	24	8	840	1 10	924 00
Al. w. Adams ave Norwich ave	Al. n. Northwood Al. w. Adams ave	Norwich avenue High street	....	33	10	1,020	1 60	1,632 00
Norwich ave 2nd al. w. High Lane ave Peasley street	High street Norwich avenue 2nd al. w. High Lane avenue	2nd al. w. High Lane avenue Peasley street Poe alley	....	36	10	1,380	1 70	2,346 00
Poe alley	High street	Peasley street	....	24	8	800	1 10	880 00
Poe alley	Peasley street	Neil avenue	....	39	10	650	3 30	2,145 00
Northwood ave	Williams street	Neil avenue	....	24	8	430	1 10	473 00
Neil avenue	Norwood avenue	Norwich avenue	....	30	8	350	1 30	455 00
Neil avenue	Norwich avenue	Poe alley	....	36	8	560	1 50	840 00
Neil avenue	Woodruff avenue	Poe alley	....	30	8	610	1 30	793 00
Poe alley	Neil avenue	Doe alley	....	42	20	900	5 30	4,770 00
Poe alley	Doe alley	Olentangy river	4	3	8	1,150	3 70	4,255 00
Total	.....	.....	....	....	.....	9,740	.....	$20,668 00

Total	$20,668 00
Thirty-two manholes, at $50.00	1,600 00
Fourteen new catch basins, at $60.00	840 00
One bulkhead at the river	200 00
Twenty connections to old catch basins, at $20.00	400 00
Three hundred square yards repaving, at 75c	225 00
Total	$23,933 00
Add ten per cent. for engineering and inspection	2,393 00
Grand total	$26,326 00

TABLE NO. 9.—(Continued)—SEWERS FOR FUTURE CONSTRUCTION.

ESTIMATE OF COST—INDIANOLA RELIEF.

Location.	From	To	Size		Depth	Length	Price	Total Cost
			Ft.	In				
Indianola ave.....	Al. n. Lane ave.....	Frambes avenue	....	24	16	450	$2 90	$1,305 00

Total	$1,305 00
Three manholes, at $50.00.....	150 00
Three new catch basins, at $60.00.....	180 00
Total	$1,635 00
Add ten per cent. for engineering and inspection.....	165 00
Grand total	$1,800 00

TABLE NO. 9.—(Continued)—SEWERS FOR FUTURE CONSTRUCTION.

Estimate of Cost.—Thirteenth Avenue Relief.

Location.	From	To	Size Ft.	Size In	Cut	Length Ft.	Price	Cost
Summit street	Al. s. Woodward	Chittenden avenue		30	20	520	$4 20	$2,184 00
Summit street	Chittenden ave	Thirteenth avenue		33	20	740	4 50	3,330 00
Thirteenth ave	Summit street	Al. e. High street		36	16	1,520	4 00	6,080 00
Indianola ave	Al. s. Thirteenth ave	Thirteenth avenue		24	12	180	1 50	270 00
Total						2,960		$11,864 00

Total	$11,864 00
Eight manholes, at $50.00	400 00
Ten new catch basins, at $60.00	600 00
Three connections to old cacth basins, at $20.00	60 00
One hundred and one and three-tenths sq. yards repaving, at 75c	76 00
Total	$13,000 00
Add ten per cent. for engineering and inspection	1,300 00
Grand total	$14,300 00

TABLE NO. 9.—(Continued)—SEWERS FOR FUTURE CONSTRUCTION.

Estimate of Cost—Second Avenue Relief and Its Branches.

Location.	From.	To	Size Ft	Size In.	Cut	Length Ft.	Price	Cost
Sixth avenue	Summit street	High street	....	24	12	1,250	$1 50	$1,875 00
High street	Sixth avenue	Smith Place						
Smith Place	High street	Dennison avenue						
Dennison ave	Smith Place	Al, n. Fifth avenue	....	36	12	1,430	2 00	2,860 00
Al. n. Fifth ave	Dennison avenue	Hunter avenue						
Hunter ave	Eighth avenue	King avenue						
King avenue	Hunter avenue	Hunter avenue	....	30	12	810	1 70	1,377 00
Hunter avenue	King avenue	Al. n. Fifth avenue	....	36	12	900	2 00	1,800 00
Hunter avenue	Al. n. Fifth avenue	Greenwood avenue	....	42	12	520	3 70	1,924 00
Hamlet street	Third street	Second avenue	....	21	12	760	1 50	1,140 00
Kerr street	First avenue	Second avenue	....	30	12	330	1 70	561 00
Second ave. produced	Hamlet street	1st al. w. High	....	30	14	1,580	1 95	3,081 00
Al. w. High street	Price avenue	Second avenue	....	27	14	410	1 80	738 00
Sixth avenue	Big Four Ry	Fifth avenue	5	6	16	1,000	6 25	6,250 00
Fifth street	Sixth avenue	Fourth avenue	5	6	16	1,040	6 25	6 500 00
Fourth avenue	Fifth street	High street						
High street	Fourth avenue	Greenwood avenue	6	3	22	2,100	11 80	24,780 00
Greenwood ave	High street	Hunter avenue	6	6	20	1,170	11 30	13,221 00
Hunter avenue	Greenwood avenue	Second avenue	6	9	22	1,550	12 50	19,375 00
Total	.....	.....	....	....	.....	14,850	.....	$85,482 00

Total	$85,482 00
Sixteen side manholes, at $110.00	1,760 00
Twenty-eight center manholes, at $50.00	1,400 00
Twenty-five connection to old catch basins, at $20.00	500 00
Eleven sewer connections, at $40.00	440 00
Thirty-five new catch basins, at $60.00	2,100 00
One thousand five hundred feet of sewer to provide for flow of sewage, at 25c	375 00
Two thousand square yards paving, at 75c	1,500 00
Total	$93,557 00
Add ten per cent. for engineering and inspection	9,356 00
Grand total	$102,913 00

TABLE NO. 9.—(Continued)—SEWERS FOR FUTURE CONSTRUCTION.

Estimate of Cost—Factory Street Storm System.

Location.	From	To	Size		Cut	Length Ft.	Price	Cost
			Ft.	In.				
Factory street.....	Al. s. First avenue.....	Southerly	....	27	14	400	$1 80	$720 00

Total	$720 00
One manhole, at $50.00.....	50 00
Two catch basins, at $60.00.....	120 00
Total	$890 00
Add ten per cent. for engineering and inspection.....	90 00
Grand total	$980 00

TABLE NO. 9.—(Continued)—SEWERS FOR FUTURE CONSTRUCTION.

Estimate of Cost—Collins Street Relief.

Location.	From	To	Size Ft.	Size In.	Cut	Length Ft.	Price	Cost
Collins street	Al. w. Penn'a ave	Al. w. Harrison	....	27	14	370	$1 80	$666 00
Collins street	Al. w. Harrison ave	Delaware avenue	....	36	14	550	2 30	1,265 00
.....	Total	.....	....	....	.....	920	.....	$1,931 00

Total	$1,931 00
Four manholes, at $50.00	200 00
Two old catch basins, connections, at $20.00	40 00
Four sewer connections, at $40.00	160 00
Two new catch basins, at $60.00	120 00
Total	$2,451 00
Add ten per cent. for engineering and inspection	245 00
Grand total	$2,696 00

TABLE NO. 9.—(Continued)—SEWERS FOR FUTURE CONSTRUCTION.

Estimate of Cost—Kilbourne Street Relief.

Location.	From	To	Size		Depth	Length	Price	Total Cost
			Ft.	In.				
Kilbourne street	Vine street	Railroad street						
Railroad street	Kilbourne street	West street sewer		24	14	370	$1 70	$629 00

Total	$629 00
Three manholes, at $50.00	150 00
Two sewer connections, at $40.00	80 00
Two old catch basin connections, at $20.00	40 00
Four new catch basins, at $60.00	240 00
Total	$1,139 00
Add ten per cent. for engineering and inspection	114 00
Grand total	$1,253 00

TABLE NO. 9.—(Continued)—SEWERS FOR FUTURE CONSTRUCTION.

In West Street, Northwest Sewer District, and all Districts North of Same. Summary.

Sewers.	Manholes.	Catch Basins	Length of Sewer, Ft.	Cost of Sewer
Hudson street relief	22	36	7,400	$25,107 00
Poe alley relief	32	14	9,740	26,326 00
Indianola avenue relief	3	3	450	1,800 00
Thirteenth avenue relief	8	10	2,960	14,300 00
Second avenue relief and branches	44	35	14,850	102,913 00
Factory street storm drain	1	2	400	980 00
Collins avenue relief	4	2	920	2,696 00
Kilbourne street relief	3	4	370	1,253 00
Totals	117	106	37,090	$175,369 00
Add total for immediate construction	59	42	16,210	104,383 00
Grand totals	176	148	53,300	$279,752 00

TABLE NO. 9.—(Continued)—SEWERS FOR FUTURE CONSTRUCTION.

Estimate of Cost—Lincoln and Fourth Streets Relief.

Location.	From.	To	Size Ft.	Size In.	Cut	Length Ft.	Price	Cost
Fourth street	Warren street	Lincoln street	....	30	16	400	$2 21	$884 00
Lincoln street	Fourth street	Kerr street	....	33	18	910	4 10	3,731 00
Total			....	....	.....	1,310	.....	$4,615 00

Total	$4,615 00
Five Manholes, at $50.00	250 00
Four catch basins, at $60.00	240 00
Two hundred and forty square yards repaving, at 75c	180 00
Total	$5,285 00
Add ten per cent. for engineering and inspection	528 00
Grand total	$5,813 00

Estimate of Cost—Popular Avenue and Fourth Street Relief.

Russell street	Kenny alley	Fourth street	....	15	14	175	$1 30	$227 50
Fourth street	Russel street	Poplar avenue	....	24	16	340	1 92	652 80
Poplar avenue	Fourth street	Kerr street	....	24	18	810	2 20	1,782 00
Total			....	....	.....	1,325	.....	$2,662 30

Total	$2,662 00
Seven manholes, at $50.00	350 00
Five catch basins, at $60.00	300 00
One hundred and ninety sq. yards repaving, at 75c	142 50
One thousand one hundred and fifty feet of sewer to provide for flow of sewage, at 25c	287 50
Total	$3,742 30
Add ten per cent. for engineering and inspection	374 70
Grand total	$4,117 00

TABLE NO. 9.—(Continued)—SEWERS FOR FUTURE CONSTRUCTION.

Estimate of Cost.—Buckingham Street and Cleveland Avenue Relief.

Location.	From	To	Size		Cut	Length Ft.	Price	Cost
			Ft.	In.				
Cleveland avenue	1600 feet	800 ft. n. of Buckingham st.	....	27	12	800	$1 60	$1,280 00
Cleveland avenue	800 feet north	Buckingham street	....	33	16	800	2 40	1,920 00
Buckingham street	Cleveland avenue	Grant avenue	....	30	18	630	2 50	1,575 00
Buckingham street	Grant avenue	Neilston street	....	33	20	500	4 50	2,250 00
Buckingham street	Neilston street	Fifth street	....	36	20	400	4 75	1,900 00
Total			....	....	.....	3,130	.....	$8,925 00

Total	$8,925 00
Ten manholes, at $50.00	500 00
Forty-four square yards repaving, at 75c	33 00
Thirteen catch basins, at $60.00	780 00
Total	$10,238 00
Add ten per cent. for engineering and inspection	1,024 00
Grand total	$11,262 00

TABLE NO. 9.—(Continued)—SEWERS FOR FUTURE CONSTRUCTION.

Estimate of Cost.—Grove Street and Mt. Vernon Avenue Relief.

Location.	From	To	Size		Cut	Length Ft.	Price	Cost
			Ft.	In.				
Grove street	Al. w. Mosette	Al. w. Grant ave	....	20	14	325	$1 80	$585 00
Al. w. Grant ave	Grove street	Brock street	....	30	16	200	2 21	442 00
Al. w. Grant ave	Brock street	Mt. Vernon avenue	....	39	16	240	4 10	984 00
Mt. Vernon ave	Kelley avenue	Sixth street	....	36	16	440	4 00	1,760 00
Grove street	Payne alley	Fifth street	....	18	14	200	2 20	440 00
Total			....	....	.....	1,405	.....	$4,211 00

Total	$4,211 00
Seven manholes, at $50.00	350 00
Six catch basins, at $60.00	360 00
Three hundred and twenty square yards repaving, at 75c	240 00
Six sewer connections, at $25.00	150 00
Eight hundred and sixty feet of sewer to provide for flow of sewage, at 25c	215 00
Total	$5,526 00
Add ten per cent. for engineering and inspection	553 00
Grand total	$6,079 00

TABLE NO. 9.—(Continued)—SEWERS FOR FUTURE CONSTRUCTION.

Estimate of Cost—Washington Avenue Relief.

Location.	From.	To	Size Ft.	Size In.	Cut	Length Ft.	Price	Cost
Al. e. St. Clair ave	Al. n. Arsenal	Arsenal avenue	....	24	12	170	$1 45	$246 50
Arsenal ave St. Clair ave Leonard ave	Al. e. St. Clair ave Arsenal ave St. Clair avenue	St. Clair avenue Leonard avenue Hamilton avenue	....	30	14	840	1 95	1,638 00
Leonard ave	Hamilton avenue	Jefferson avenue	....	39	16	530	4 10	2,173 00
Al. w. Lexington Grove street Jefferson ave	Leonard avenue Al. w. Lexington Grove street	Grove street Jefferson avenue Al. w. Mt. Vernon avenu	....	18	18	1,890	4 75	8,977 50
Jefferson ave Mt. Vernon ave	Al. n. Mt. Vernon Jefferson avenue	Mt. Vernon avenue Washington avenue	....	45	20	1,110	5 40	5,994 00
Total	.....	....	....	....	.....	4,540	.....	$19,029 00

Total	$19,029 00
Seven catch basins, at $60.00	420 00
Eighteen manholes, at $50.00	900 00
One thousand two hundred and seventy sq. yards of brick relaid, at 75c	952 50
Seventy-six square yards macadam repaved, at 75c	57 00
Four hundred and fifty square yards asphalt repaved, at $2.50	1,125 00
Three sewer connections, at $25.00	75 00
Two thousand and fifty feet. of sewer to provide for flow of sewage, at 25c	512 50
Total	$23,071 00
Add ten per cent. for engineering and inspection	2,307 00
Grand total	$25,378 00

TABLE NO. 9.—(Continued)—SEWERS FOR FUTURE CONSTRUCTION.

Estimate of Cost—Felton Avenue Relief.

Location.	From.	To	Size. Ft.	Size. In.	Cut	Length Ft.	Price	Cost
Felton avenue	Al. w. Galloway	Galloway avenue	....	15	16	170	$1 35	$229 50

Total	$229 50
One catch basin, at $60.00	60 00
Seventy-five square yards paving, at 75c	56 25
Total	$345 75
Add ten per cent. for engineering and inspection	34 25
Grand total	$380 00

Estimate of Cost—Atcheson Street Relief.

Location.	From	To	Size Ft.	Size In.	Cut	Length Ft.	Price	Cost
Atcheson street	Al. w. Monroe	Galloway avenue	....	18	18	510	$1 90	$969 00

Total	$969 00
Three manholes, at $50.00	150 00
Two catch basins, at $60.00	120 00
Forty square yards repaving, at 75c	30 00
One sewer connection	25 00
Total	$1,294 00
Add ten per cent. for engineering and inspection	129 00
Grand total	$1,423 00

TABLE NO. 9.—(Continued)—SEWERS FOR FUTURE CONSTRUCTION.

Estimate of Cost—Hamilton Avenue Relief.

Location.	From.	To	Size Ft.	Size In.	Cut	Length Ft.	Price	Cost
Hamilton ave	Spring street	Long street		27	16	530	$2 10	$1,218 00

Total	$1,218 00
Two manholes, at $50.00	100 00
Thre hundred and fifty feet of sewer to provide for flow of sewage, at 25c	87 50
Three hundred and thirty square yards asphalt repaving, at $2.50	825 00
Total	$2,230 00
Add ten per cent. for engineering and inspection	224 00
Grand total	$2,454 00

Estimate of Cost.—Monroe Avenue Relief.

Monroe avenue	Spring street	Long street		24	12	590	$2 20	$1,298 00

Total	$1,298 00
Two manholes, at $50.00	100 00
Three hundred and thirty square yards brick repaving, at 75c	247 50
Five hundred and and ninety feet of sewer to provide for flow of sewage, at 25c	147 50
Total	$1,793 00
Add ten per cent. for engineering and inspection	179 00
Grand total	$1,972 00

TABLE NO. 9.—(Continued)—SEWERS FOR FUTURE CONSTRUCTION.

Estimate of Cost.—Twentieth Street and East Spring Street Relief.

Location.	From.	To	Size. Ft.	Size. In.	Cut	Length Ft.	Price	Cost
Al. n. Hawthorne	Al. e. Champion	Al. e. Ohio avenue	....	24	14	220	$1 70	$374 00
Spring street	Al. e. Ohio avenue	Al. e. Twenty-second street	....	27	16	220	2 10	462 00
Spring street	Al. e. Twenty-second st.	Twentieth street	....	33	16	800	2 40	1,920 00
Twentieth street	Spring street	Long street	....	36	12	880	3 30	2,904 00
.....	Total	....	....	....	.....	2,120	.....	$5,660 00

Total	$5,660 00
Thirteen manholes, at $50.00	650 00
Four catch basins, at $60.00	240 00
One hundred square yards asphalt repaving, at $2.50	250 00
Seven hundred and eighty-six square yards brick repaving, at 75c	589 50
Eight sewer connections, at $20.00	160 00
Three hundred feet of sewer to provide for flow of sewage, at 25c	75 00
Total	$7,624 50
Add ten per cent. for engineering and inspection	762 50
Grand total	$8,387 00

TABLE NO. 9.—(Continued)—SEWERS FOR FUTURE CONSTRUCTION.

Estimate of Cost.—Mt. Vernon Avenue and Atcheson Street District Relief.

Location.	From	To	Size Ft.	Size In.	Depth	Length	Price	Total Cost
Al. w. Gibbon street....	Al. n. Hildreth.....	Al. n. Mt. Vernon ave.....	....	21	14	300	$1 70	$510 00
Al. w. Gibbon street....	Al. n. Mt. Vernon.....	Mt. Vernon avenue.....	....	27	16	1,200	2 10	2,520 00
Mt. Vernon ave.....	Al. w. Gibbon street....	Bolivar street						
Mt. Vernon ave.....	Bolivar street	Eighteenth street	....	36	16	120	4 00	480 00
Total.....	.....	....	....	....	.....	1,620	.....	$3,510 00

Total	$3,510 00
Seven manholes, at $50.00.....	350 00
Five catch basins, at $60.00.....	300 00
Eight hundred square yards repaving, at 75c.....	600 00
One hundred and twenty feet of sewer to provide for flow of sewage, at 25c.....	30 00
Five sewer connections, at $25.00.....	125 00
Total	$4,915 00
Add ten per cent. for engineering and inspection.....	491 00
Grand total	$5,406 00

TABLE NO. 9.—(Continued)—SEWERS FOR FUTURE CONSTRUCTION.

Estimate of Cost.—Medill and Toronto Streets Relief.

Location.	From	To	Size Ft.	Size In.	Cut	Length Ft.	Price	Cost
Al. s. Leonard	Rhodes alley	Olive alley	....	18	14	300	$1 54	$462 00
Olive alley	Al. s. Leonard	Toronto street	....	24	16	160	1 92	307 20
Toronto street	Al. e. Wetmore	Olive alley	....	27	16	600	2 10	1,260 00
Toronto street	Al. e. Trevitt	Al. e. Trevitt	....	21	14	330	1 70	561 00
Toronto street, Twentieth street	Olive alley, Toronto street	Twentieth street, Medill street	....	30	16	490	2 21	1,082 90
Olive alley, Medill street	Division alley, Olive alley	Medill street, Twentieth street	....	30	18	380	2 50	3,950 00
Medill street	Twentieth street	Al. w. Twentieth street	....	39	18	170	4 60	782 00
Medill street	Al. w. Twentieth street	Denmead and Leonard	....	42	18	640	4 80	3,072 00
Total	.....	.....	....	....	.....	3,070	.....	$8,477 10

Total	$8,477 10
Fifteen manholes, at $50.00	750 00
Fifteen catch basins, at $60.00	900 00
Six sewer connections, at 25.00	150 00
Two hundred and eighty-eight square yards of repaving (asphalt), at $2.50	720 00
Six hundred and forty-two square yards of repaving (brick), at 75c	481 50
One thousand and ten feet of sewer to provide for flow of sewage, at 25c	252 50
Total	$11,731 10
Add ten per cent. for engineering and inspection	1,173 90
Grand total	$12,905 00

TABLE NO. 9.—(Continued)—SEWERS FOR FUTURE CONSTRUCTION.

Summary—In Central Relief District.

Sewers.	Manholes.	Catch Basins.	Length of Sewer, Ft.	Cost of Sewer
Lincoln and Fourth streets relief	5	4	1,310	$5,813 00
Poplar avenue relief	7	5	1,325	4,117 00
Buckingham street relief	10	13	3,130	11,262 00
Grove and Mt. Vernon avenue relief	7	6	1,405	6,079 00
Washington avenue relief	18	7	4,540	25,378 00
Felton avenue relief	.....	1	170	380 06
Atcheson street relief	3	2	510	1,423 00
Hamilton avenue relief	2	.....	580	2,454 00
Monroe avenue relief	2	.....	590	1,972 00
Twentieth street relief	13	4	2,120	8,387 00
Mt. Vernon avenue and Atcheson street relief	7	5	1,620	5,406 00
Medill and Toronto streets relief	15	15	3,070	12,905 00
Totals	89	62	20,370	$85,576 00
Add for immediate construction in above district	42	28	16,845	227,370 00
Grand totals	131	90	37,215	$312,946 00

TABLE NO. 9.—(Continued)—SEWERS FOR FUTURE CONSTRUCTION.

Estimate of Cost.—Granville Street Relief.

Location.	From.	To	Size Ft.	Size In.	Cut	Length Ft.	Price	Cost
Granville street	Al. w. Winner avenue	Johnson street	....	21	12	1,240	$1 60	$1,984 00
Granville street	Johnson street	Mulberry street	....	24	12	1,070	1 50	1,605 00
Granville street	Mulberry street	Woodland avenue	....	27	12	600	1 55	930 00
Granville street	Woodland avenue	East to Nelson's ditch	....	30	14	780	1 95	1,521 00
Total			....	....	.....	3,690	.....	$6,040 00

Total	$6,040 00
Sixteen manholes, at $50.00	800 00
Eight catch basins, at $60.00	480 00
One hundred and fifty square yards repaving, at 90c	135 00
Total	$7,455 00
Add ten per cent. for engineering and inspection	745 00
Grand total	$8,200 00

Estimate of Cost.—Franklin Park Overflow Sewer.

Franklin Park	Franklin Park sewer	Alum creek	....	75	20	1,400	$8 00	$11,480 00

Total	$11,480 00
Three manholes, at $110.00	330 00
One large sewer connection	250 00
Bulkhead at Alum creek	500 00
One thousand four hundred and eighty-five yards to resod the park, at 25c	370 00
Total	$12,930 00
Add ten per cent. for engineering and inspection	1,293 00
Grand total	$14,223 00

TABLE NO. 9.—(Continued)—SEWERS FOR FUTURE CONSTRUCTION.

Estimate of Cost.—Miller Avenue Relief.

Location.	From.	To	Size Ft.	Size In.	Cut	Length Ft.	Price	Cost
Latta ave	Al. n. Fair avenue	Fair avenue						
Fair avenue	Latta avenue	Second al. w. Miller	....	24	14	830	$1 70	$1,411 00
2nd al. w. Miller	Fair avenue	First all n. Oak						
2nd al. w. Miller	1st al. n. Oak street	Elliott alley						
Elliott alley	2nd al. w. Miller	Alley w. Rose	....	27	14	1,040	1 75	1,820 00
Elliott aliey	Al. w. Rose avenue	Morrison avenue	....	33	12	1,300	1 85	2,405 00
Al. w. Miller ave	Madison avenue	First al. n. Fair	....	24	12	250	1 50	375 00
Al. w. Miller ave	Al. n. Fair avenue	Fair avenue						
Fair avenue	1st al. w. Miller	Alley w. Rose	....	27	14	480	1 75	857 50
Total	.....	.....	....	....	.....	3,910	.....	$6,868 50

Total	$6,868 50
Thirteen manholes, at $50.00	650 00
Three catch basins, at $60.00	180 00
Provision for flow of sewage	100 00
One sewer connection	50 00
Five hundred and ten square yards repaving, at 90c	459 00
Total	$8,307 50
Add ten per cent. for engineering and inspection	830 50
Grand total	$9,138 00

TABLE NO. 9.—(Continued)—SEWERS FOR FUTURE CONSTRUCTION.

Estimated cost.—Eastwood avenue relief.

Location.	From	To	Size Ft.	Size In.	Depth Feet	Length Feet	Price	Total Cost
Hughes street	Al. n. Hawthorne	Alley n. Long street. Burt avenue	....	20	12	820	$1 60	$1,312 00
Al. n. Long street	Hughes street	Taylor avenue	....	27	14	580	1 75	1,015 00
Al. n. Long street	Burt avenue	Woodland avenue	....	30	12	1,180	1 75	2,065 00
Al. n. Long street	Taylor avenue	E. to Franklin Park sewer	....	33	12	670	1 85	1,239 50
Al. n. Long street	Woodland avenue	Alley n. Long street	....	24	12	740	1 50	1,110 00
Burt avenue	Al. s. Eastwood							
Total			....	....	.....	3,990	.....	$6,741 50

Total	$6,741 50
Fifteen manholes, at $50.00	750 00
Twelve catch basins, at $60.00	720 00
Seventy square yards repaving, at 90c	63 00
Provisions for removing sewage during construction	300 00
Total	$8,574 50
Add ten per cent. for engineering and inspection	857 50
Grand total	$9,432 00

TABLE NO. 9.—(Continued)—SEWERS FOR FUTURE CONSTRUCTION.

Estimate of cost.—Town street relief.

Location.	From.	To	Size		Cut	Length Ft.	Price	Cost
			Ft	In.				
Washington ave.....	Town street.....	Cherry street	....	30	12	720	$1 75	$1,260 00

Total	$1,260 00
Three manholes, at $50.00.....	150 00
One catch basin	60 00
One sewer connection	50 00
Four hundred square yards repaving, at 90c.....	360 00
Total	$1,880 00
Add ten per cent. for engineering and inspection.....	188 00
Grand total	$2,068 00

TABLE NO. 9.—(Continued)—SEWERS FOR FUTURE CONSTRUCTION.

Estimate of Cost.—Fulton Street Relief.

Location.	From	To	Size Ft.	Size In.	Cut	Length Ft.	Price	Total Cost
Fulton street	Al. w. Eighteenth st	Seventeenth street	....	27	16	250	$2 05	$512 50
Fulton street	Seventeenth street	Monroe avenue	....	33	14	330	2 05	676 50
Fulton street	Monroe avenue	Alley w. Parsons	....	42	12	1,030	2 15	2,214 50
Total	....	....	....	....	.....	1,610	.....	$3,403 50

Total	$3,403 50
Five manholes, at $50.00	250 00
Three catch basins, at $60.00	180 00
Ninety square yards repaving, at 90c	81 00
Total	$3,914 50
Add ten per cent. for engineering and inspection	391 50
Grand total	$4,306 00

TABLE NO. 9.—(Continued)—SEWERS FOR FUTURE CONSTRUCTION.
Estimate of Cost—Southern Relief Sewer.

Location.	From	To	Size Ft.	Size In.	Cut	Length Ft.	Price	Cost
Deshler avenue	Front street	Blackberry alley	....	90	21	2,330	$13 10	$30,523 00
Deshler avenue Bruck street	Blackberry alley Deshler avenue	Bruck street Section alley	....	78	21	3,170	8 80	27,896 00
Al. w. Beech street Sycamore street	Section alley Al. w. Beech street	Sycamore street Wager street	....	75	21	2,065	8 55	17,656 00
Sycamore street	Wager street	Eighteenth street	....	69	21	1,000	8 00	8,000 00
Sycamore street	Eighteenth street	Gilbert street	....	60	21	1,000	7 15	7,150 00
Sycamore street	Gilbert street	Ohio avenue	....	66	21	700	7 70	5,390 00
Ohio avenue Livington ave Al. e. Ohio ave	Sycamore street Ohio avenue Livingston avenue	Livingston avenue Alley e. Ohio avenue Newton street	....	57	20	1,370	6 60	9,042 00
Al. e. Ohio ave Mooberry street	Newton street Al. e. Ohio avenue	Mooberry street Champion avenue	....	45	20	830	5 50	4,565 00
Humboldt street	Front street	Scioto river	....	48	tun.	270	13 50	3,645 00
Total			....	....	.....	12,735	.....	$113,867 00

Total	$113,867 00
Thirty-three manholes, at $110.00	3,630 00
Three center manholes, at $55.00	165 00
Thirty-three catch basins, at $60.00	1,920 00
Well at Front street	1,000 00
Connection with intercepting sewer	357 00
Bulkhead at the river	536 00
One thousand eight hundred feet old sewer, providing for flow of sewage, at 25c.	450 00
Three connections to large sewers, at $100.00	300 00
Six hundred and fifteen square yards repaving, at 90c	554 00
Total	$122,839 00
Add ten per cent for engineering and inspection	12,284 00
Grand total	$135,123 00

TABLE NO. 9.—(Continued)—SEWERS FOR FUTURE CONSTRUCTION.

Estimate of Cost.—Newton Street Branch.

Location.	From	To	Size Ft.	Size In.	Depth	Length	Price	Total Cost
Newton street	Al. w. Carpenter	Alley w. Gilbert	....	30	13	390	$1 85	$721 50
Newton street	Al. w. Gilbert	Alley w. Twenty-second st.	....	33	16	310	2 40	744 00
Newton street	Al. w. 22nd street	Alley w. Ohio avenue	....	36	17	350	2 70	945 00
Newton street	Al. w. Ohio avenue	Alley w. Champion	....	39	18	400	3 05	1,220 00
Newton street	Al. w. Champion ave.	Alley w. Oakwood	....	36	18	380	2 90	1,102 00
Newton street	Al. w. Oakwood avenue.	Alley w. Oakwood	....	33	13	370	2 40	888 00
Newton street	Al. w. Wilson avenue.	Alley w. Linwood	....	27	13	460	1 75	805 00
Newton street	Al. w. Linwood ave.	Alley e. Wilson	....	24	12	350	1 50	525 00
Total			....	....	.....	3,010	.....	$6,950 00

Total	$6,950 00
Seven sewer connections, at $20.00	140 00
Eight manholes, at $50.00	400 00
Seven catch basins, at $60.00	420 00
One hundred and ten square yards repaving, at 90c	99 00
Total	$8,009 50
Add ten per cent. for engineering and inspection	800 50
Grand total	$8,810 00

Oakwood and Sycamore Branch.

Location.	From	To	Size Ft.	Size In.	Depth	Length	Price	Total Cost
Oakwood avenue	Forest street	Sycamore street	....	36	18	400	$2 90	$1,160 00
Sycamore street	Oakwood avenue	Ohio avenue	....	36	21	750	3 45	2,587 50
Total			....	....	.....	1,150	.....	$3,747 50

Total	$3,747 50
Four manholes, at $50.00	200 00
One connection with sewer	50 00
Two hundred and forty-five square yards asphalt pavement, at $3.00	735 00
Total	$4,732 50
Add ten per cent. for engineering and inspection	473 50
Grand total	$5,206 00

TABLE NO. 9.—(CONTINUED)—SEWERS FOR FUTURE CONSTRUCTION

Estimate of Cost.—Ohio Avenue Branch.

Location.	From	To	Size Ft.	Size In.	Cut	Length Ft.	Price	Cost
Ohio avenue	Forest street	Sycamore street	....	33	18	400	$2 70	$1,080 00

Total	$1,080 00
One manhole, at $50.00	50 00
Two catch basins, at $60.00	120 00
One large sewer connection	50 00
Total	$1,300 00
Add ten per cent. for engineering and inspection	130 00
Grand total	$1,430 00

TABLE NO. 9 —(CONTINUED)—SEWERS FOR FUTURE CONSTRUCTION.

Estimate of Cost.—Gilbe t Street Branch.

Gilbert street	Forest street	Sycamore street	....	27	18	400	$2 40	$960 00

Total	$960 00
One manhole, at $50.00	50 00
Two catch basins, at $60.00	120 00
One sewer connection	50 00
Total	$1,180 00
Add ten per cent. for engineering and inspection	118 00
Grand total	$1,298 00

TABLE NO. 9.—(CONTINUED)—SEWERS FOR FUTURE CONSTRUCTION.

Estimate of Cost.—Eighteenth Street Branch

Location	From	To	Size. Ft.	Size. In.	Cut	Length	Price	Cost
Eighteenth street	Forest street	Sycamore street		30	18	400	$2 50	$1,000 00

Total	$1,000 00
One manhole, at $50.00	50 00
Two catch basins, at $60.00	120 00
One sewer connection	50 00
Total	$1,220 00
Add ten per cent. for engineering and inspection	122 00
Grand total	$1,342 00

TABLE NO. 9.—(CONTINUED—SEWERS FOR FUTURE CONSTRUCTION

Estimate of Cost.—Central Alley Branch.

Location	From	To	Size. Ft.	Size. In.	Cut	Length	Price	Cost
Central alley	Livingston avenue	Sycamore street		27	20	900	$2 70	$2,430 00

Total	$2,430 00
Three manholes, at $50.00	150 00
One sewer connection	50 00
Fifteen square yards repaving, at 90c	13 50
Total	$2,643 50
Add ten per cent. for engineering and inspection	264 50
Grand total	$2,908 00

TABLE NO. 9 —(CONTINUED- SEWERS FOR FUTURE CONSTRUCTION.

Estimate of Cost.—Wager Street Branch.

Location.	From.	To	Size Ft	Size In	Cut	Length Ft.	Price	Cost
Wager street	Livington avenue	Sycamore street	....	27	20	1,070	$2 70	$2,889 00
Wager street	Forest street	Sycamore street	....	30	18	400	2 60	1,040 00
Total	.....	.....	....	....	.....	1,470	.....	$3,929 00

Total	$3,929 00
Five manholes, at $50.00	250 00
One catch basin	60 00
Two sewer connections, at $50.00	100 00
Fifteen square yards repaving, at 90c	13 50
Total	$4,352 50
Add ten per cent. for engineering and inspection	435 50
Grand total	$4,788 00

SUMMARY OF SEWERS IN SOUTHERN RELIEF SYSTEM, PROPOSED FOR FUTURE CONSTRCTION.

Sewer.	Length.	Cost.
Main	12,735	$135,123 00
Newton street branch	3,010	8,810 00
Oakwood avenue branch	1,150	5,206 00
Ohio avenue branch	400	1,430 00
Gilbert street branch	400	1,298 00
Eighteenth street branch	400	1,342 00
Central alley branch	900	2,908 00
Wager street branch	1,470	4.728 00
Totals	20,465	$160,905 00

TABLE NO. 9—(Continued)—SEWERS FOR FUTURE CONSTRUCTION.

Summary of Projected Sewers in Peters' Run, Moler Street and Alum Creek Districts.

Sewer	Manholes	Catch Basin	Length of Sewer – Ft	Cost of Sewer
Granville street relief	16	8	3,690	$8,200 00
Franklin Park overflow	3	.....	1,400	14,223 00
Miller avenue relief	13	3	3,910	9,138 00
Eastwood avenue relief	15	12	3,990	9,432 00
Town street relief	3	1	720	2,068 00
Fulton street relief	5	3	1,610	4,306 00
Southern relief sewer	36	33	12,735	135,123 00
Newton street branch	8	7	3,010	8,810 00
Oakwood avenue and Sycamore street branch	4	.....	1,150	5,206 00
Central alley branch	3	.....	900	2,908 00
Wager street branch	5	1	1,470	4,788 00
Ohio avenue branch	1	2	400	1,430 00
Gilbert street branch	1	2	400	1,298 00
Eighteenth street branch	1	2	400	1,342 00
Totals	114	74	35,785	$208,272 00
Adding estimate for immediate construction	33	15	9,320	52,185 00
Grand totals	147	89	45,105	$260,457 00

45,105 feet—8.55 miles of sewer.

TABLE NO. 9.—(CONTINUED)—SEWERS FOR FUTURE CONSTRUCTION.

Estimate for Sanitary Sewers in Sub-District "K" of Sewer District No. 1.

Location.	From	To	Size		Cut	Length	Price	Cost
			Ft.	In.				
Al. n. Merion	Twenty-second street	Carpenter street	....	12	16	460	$1 27	$584 20
Al. n. Merion	460 ft. of 22nd street	Gretna avenue	....	12	14	765	1 09	833 85
Al. n. Merion	Gretna avenue	Alley e. Parsons	....	12	12	1,310	92	1,205 20
Total	.....	.....	....	....	.....	2,535	.....	$2,623 25

Total	$2,623 25
Thirteen manholes, at $50.00	650 00
Total	$3,273 25
Add ten per cent. for engineering and inspection	327 75
Grand total	$3,601 00

TABLE NO. 9—(CONTINUED)—SEWERS FOR FUTURE CONSTRUCTION.

Estimate of Cost—Proposed Storm Drains in Sub-District "K" of Sewer District No. 1.

Location.	From	To	Size Ft.	Size In.	Cut	Length Ft.	Price	Cost
Wagner street	Kossuth street	Stanley street	....	18	10	330	$1 18	$389 40
Wagner street, Reinhard ave	Stanley street, Wagner street	Reinhard avenue, Carpenter street	2	9	10	760	1 60	1,216 00
Carpenter street	Reinhard avenue	Siebert street	3	3	10	390	3 23	1,259 70
Carpenter street	Siebert street	Germania street	3	6	8	310	2 80	868 65
Carpenter street	Germania street	Thurman street	3	9	10	815	3 61	2,942 15
Carpenter street	Thurman street	Gates street	4	....	12	750	4 13	3,097 50
Carpenter street	Gates street	Merion street	4	3	12	595	4 33	2,576 35
Merion street	Carpenter street	Gretna avenue	4	9	14	765	5 14	3,932 10
Merion street	Gretna avenue	Ann street	5	....	14	800	5 35	4,280 00
Merion street	Ann street	Parsons avenue	4	9	14	690	5 14	3,546 60
Merion street	Twenty-second street	Carpenter street	5	....	14	460	5 35	2,461 00
Gates street	Twenty-second street	Carpenter street	....	24	10	460	1 25	575 00
Thurman street	Twenty-second street	Carpenter street	....	24	10	460	1 25	575 00
Siebert street	Twenty-second street	Carpenter street	....	24	10	450	1 25	562 50
Stanley street	Twenty-second street	Wagner street	....	24	10	240	1 25	300 00
Heyl avenue	Kossuth street	Stanley street	....	18	8	330	1 04	343 20
Heyl avenue, Reinhard avenue	Stanley street, Heyl avenue	Reinhard avenue, Gretna avenue	2	3	10	755	1 37	1,034 35
Gretna avenue	Reinhard avenue	Germania street	2	9	12	700	1 82	1,274 00
Gretna avenue	Germania street	Thurman street	3	3	12	815	3 51	2,860 00
Gretna avenue	Thurman street	Gates street	3	6	14	750	4 05	3,057 50
Gretna avenue	Gates street	Merion street	3	9	14	595	4 26	2,534 70
Gates street	Heyl avenue	Gretna avenue	....	12	10	370	80	296 00

TABLE NO. 9.—(CONTINUED)—SEWERS FOR FUTURE CONSTRUCTION.

Estimate of Cost—Proposed Storm Drains in Sub-District "K" of Sewer District No 1.—(Continued.)

Location.	From	To	Size Ft.	Size In.	Cut	Length Ft.	Price	Cost
Thurman street	Heyl avenue	Gretna avenue	....	24	12	370	1 46	540 20
Germania street	Heyl avenue	Gretna avenue	....	24	12	370	1 46	540 20
Eighteenth street	Schiller street	Reinhard avenue	....	18	8	400	1 04	416 00
Ann street	Al. n. Thurman	Mithoff street	....	24	10	500	1 25	625 00
Ann street	Heyl avenue	Gates street	2	3	8	430	1 18	507 40
Ann street	Gates street	Hanford street	2	6	8	300	1 30	390 00
Ann street	Hanford street	Merion street	2	9	10	290	1 60	464 00
Hanford street	Seventeenth street	Ann street	....	18	10	350	1 18	413 00
Mithoff street	Seventeenth street	Ann street	....	18	10	350	1 18	413 00
Deshler avenue	Seventeenth street	Alley w. Seventeenth st	....	18	12	160	1 35	216 00
Al. n. Siebert	Seventeenth street	Wager street	....	18	12	680	1 35	918 00
Total	.....	.....	....	....	.....	17,700	.....	$46,515 40

Total	$46,515 40
Fifty-six manholes, at $50.00	2,800 00
One hundred and twelve catch basins, at $60.00	6,720 00
Total	$56,035 40
Add ten per cent. for engineering and inspection	5,603 60
Grand total	$61,639 00

TABLE NO. 9 - (CONTINUED)--SEWERS FOR FUTURE CONSTRUCTION

Estimated Cost of Storm Water Drains Proposed Within the Corporate Limits South of Moler Street for Future Construction.

Location.	From.	To	Size		Cut	Length Ft.	Price	Cost
			Ft.	In.				
Seventh street	S. corp. line	Hosack street	10	....	14	550	$13 50	$7,425 00
Hosack street	Seventh street	East corp. line	9	....	16	1,680	13 10	22,008 00
Seventh street	Hosack street	Innis avenue	7	....	16	1,275	10 60	13,515 00
Seventh street	Innis avenue	Wood avenue	6	9	16	505	10 30	5,206 50
Seventh street	Wood avenue	Markison avenue	5	9	16	1,351	6 50	8,781 50
Seventh street	Markison avenue	Jenkins avenue	6	..	14	740	6 20	4,588 00
Jenkins avenue	Seventh street	East corp. line	5	9	14	1,680	6 00	10,080 00
Innis avenue	Seventh street	Fourth street	4	....	16	1,050	4 90	5,145 00
Fourth street	Innis avenue	Wood avenue	4	....	12	505	4 10	2,070 50
Fourth street	Wood avenue	Morrill avenue	3	3	12	661	3 50	2,313 50
Morrill avenue	Fourth street	Third street	3	3	14	370	3 85	1,424 50
Third street	Morrill avenue	Markison avenue	3	....	14	690	3 60	2,484 00
Third street	Markison avenue	Jenkins avenue	....	30	12	744	1 70	1,264 80
Merritt street	Seventh street	Fifth street	....	30	12	721	1 70	1,225 70
Merritt street	Fifth street	High street	....	24	12	810	1 50	1,215 00
Fifth street	Merritt street	Hosack street	....	18	10	294	1 20	352 80
Barthman avenue	Seventh street	Fifth street	....	30	12	721	1 70	1,225 70
Barthman avenue	Fifth street	Fourth street	....	24	10	329	1 25	411 25
Barthman avenue	Fourth street	High street	....	18	10	550	1 20	660 00
Fifth street	Barthman avenue	Reeb avenue	....	18	10	368	1 20	441 60
Wood avenue	Fifth street	High street	....	24	10	1,030	1 25	1,287 50
Morrill avenue	Fourth street	Fifth street	....	18	10	329	1 20	394 80
Welch avenue	Third street	High street	....	24	10	440	1 25	550 00
Markison avenue	Third street	Fourth street	....	24	10	370	1 25	462 50
Jenkins avenue	City Park avenue	Fourth street	....	18	10	576	1 20	691 20
Ninth street	Hosack street	Merritt street	....	24	8	294	1 10	323 40

TABLE NO. 9—(CONTINUED)—SEWERS FOR FUTURE CONSTRUCTION.

Estimated Cost of Storm Water Drains Proposed Within the Corporate Limits South of Moler Street for Future Construction— Cont'd)

Location.	From	To	Size Ft.	Size In.	Cut	Length Ft.	Price	Cost
Barthman avenue	Seventh street	Eighth street	....	24	10	345	1 25	431 25
Barthman avenue	Eighth street	Washington avenue	....	18	10	580	1 20	696 00
Reeb avenue	Seventh street	Eighth street	....	18	10	345	1 20	414 00
Innis avenue	Seventh street	Eighth street	....	24	10	345	1 25	431 25
Innis avenue	Eighth street	Washington avenue	....	18	10	580	1 20	696 00
Wood avenue	Seventh street	East corp. line	4	....	14	1,680	4 50	7,560 00
Washington avenue	Wood avenue	Hinman avenue	....	18	10	331	1 20	397 20
Morrill avenue	Seventh street	Eighth street	....	18	10	345	1 20	414 00
Welch avenue	Sixth street	Washington avenue	....	24	12	1,295	1 50	1,942 50
Welch avenue	Washington ave	Parsons avenue	....	18	10	525	1 20	630 00
Washington avenue	Welch avenue	Markison avenue	....	18	10	345	1 20	414 00
Jenkins avenue	Seventh street	Sixth street	....	24	10	370	1 25	462 50
Total			....	....		25,719		$110,036 45

Total	$110,036 45
Thirteen large manholes, at $110.00	1,430 00
Forty-seven smaller manholes, at $55.00	2,585 00
Masonry end wall, 60 cubic yards, at $6.00	360 00
Crossings	500 00
One hundred and fifty-six catch basins, at $60.00	9,360 00
Total	$124,271 45
Add ten per cent. for engineering and inspection	12,428 55
Grand total	$136,700 00

TABLE NO. 10.

Grand Summary of Sewers for Future Construction.

Sewer District	Manholes No.	Catch Basins No	Length of Sewer - Ft.	Cost of Sewer
Northwest, Poe alley and North Columbus	117	106	37,090	$175,369 00
Central relief	89	62	20,370	85,576 00
Peters' run, Alum creek and Moler street	114	74	35,785	203,272 00
Sub-district "K" (storm)	56	112	17,700	61,639 00
Sub-district "K" (sanitary)	13	.....	2,535	3,601 00
Kian run (storm)	60	156	25,719	136,700 00
Totals	449	510	139,199	$671,157 00

Length of storm drains	62,359 feet	11.81 miles.
Length of combined sewers	74,305 feet	14.07 miles.
Length of sanitary sewers	2,535 feet	0.48 miles.
Totals	139,199 feet	29.36 miles.

TABLE NO 10.

Grand Summary of Sewers for Immediate and Future Construction.

Sewer District	Manholes.	Catch Basins.	Length of Sewer.—Ft.	Co t of Sewer.
Total for immediate construction	707	215	163,679	$729,781 49
Total for future construction	449	510	139,199	671,157 00
Grand totals	1,156	725	302,878	$1,400,938 49

Total length of storm drains ..... 76,083 feet—14.41 miles.
Total length of combined sewers ..... 115,750 feet—21.92 miles.
Total length of sanitary sewers ..... 111,045 feet—21.03 miles.

Total of all sewers ..... 302,878 feet—57.36 miles.

TABLE NO. 11.

SHOWING COMPARISON OF SEWER CAPACITY WITH STORM FLOW FOR COLUMBUS, OHIO, EAST OF SCIOTO AND OLENTANGY RIVERS.

North Columbus Sewer District.

Formula Values { s=30.00, c= 0.45, r= 2.75

Sewer	Location of Test	Size Ft	Size In.	Grade	Capacity in C. F. S.	Intial Area Drained	Total Area Drained	Storm Flow C. F. S.	Excess Flow
Maynard avenue	Summit street	....	15	1–125	5.5	8.0	.....	13.5	8.6
Maynard avenue	Shattuck street	....	20	1–125	12.8	7.2	15.2	21.7	8.9
Dayton avenue	Clinton street	....	15	1–167	4.85	7.5	.....	12.7	7.9
Clinton street	Dayton avenue	....	20	1–125	12.8	11.4	26.6	33.0	20.2
Al. w. Dayton	Hudson street	....	15	1–200	4.4	4.9	.....	8.5	4.1
Clinton street	Deming avenue	....	20	1–167	10.7	8.1	13.0	18.0	7.3
Clinton street	Findlay avenue	....	33	1–100	53.0	.....	55.0	60.0	7.0
Al. w. Deming	Hudson street	....	15	1–167	4.85	5.4	.....	10.0	5.1
Al. n. Clinton	Medary avenue	....	15	1–50	8.6	8.0	13.0	18.2	9.6
Al. n. Clinton	Findlay avenue	....	15	1–100	6.1	8.2	21.6	27.5	21.4
Clinton street	Findlay avenue	....	33	1–100	53.0	.....	55.0	60.0	7.0
Al. w. East avenue	Tompkins street	....	33	1–100	53.0	.....	86.3	86.3	33.3
Al. n. Tompkins	Findlay avenue	....	15	1–100	6.1	8.2	.....	13.8	7.7
Al. n. Tompkins	High street	....	36	1–100	68.0	.....	101.9	99.0	31.0
Al. n. Tompkins	Neil avenue	....	24	1– 22	48.0	9.2	111.1	105.0	57.0
Al. n. Hudson street	Adams street	....	15	1– 28	12.0	9.5	15.4	21.9	9.9
Al. n. Hudson street	Medary avenue	....	15	1– 17	15.0	5.9	.....	11.0	.....
Al. n. Hudson street	Findlay avenue	....	15	1–100	6.1	8.9	24.3	31.3	25.2
Al. n. Hudson street	High street	....	18	1– 43	15.5	7.5	31.8	38.0	22.5
Al. n. Hudson street	Alley west Neil	....	18	1– 19	25.0	8.6	40.4	47.0	22.0
Al. n. Duncan street	High street	....	15	1– 50	8.6	7.5	.....	12.7	4.1
Al. n. Duncan street	Alley west Neil	....	20	1– 50	19.5	8.5	16.0	24.0	4.5
Al. n. Hudson street	Alley west Neil	....	48	1– 77	167.0	.....	167.5	146.0	.....

TABLE NO. 11.—(Continued.)
Joe Alley Sewer District.

Formula Values { s=30.00, c= 0.45, r= 2.75

Sewer	Location of Test	Size Ft.	Size In	Grade	Capacity in C. F. S.	Initial Area Drained	Total Area Drained	Storm Flow C. F. S	Excess Flow
Neil avenue	Clinton avenue	....	20	1- 77	16.0	8.2	.....	13.8	.....
Neil avenue	Maynard avenue	....	24	1- 40	36.0	7.1	15.3	21.8	.....
Neil avenue	Patterson avenue	....	24	1- 40	36.0	7.8	23.1	30.0	.....
Neil avenue	Northwood avenue	....	30	1-143	34.5	21.0	44.1	50.0	15.5
Neil avenue	Norwich avenue	....	30	1-143	34.5	11.0	55.1	60.1	25.6
Neil avenue	Alley north Lane	....	33	1-143	44.0	11.5	66.6	70.0	26.0
Doe alley	Frambes avenue	....	33	1-100	53.0	26.1	92.7	92.0	39.0
Poe alley	Neil avenue	....	15	1- 59	8.0	13.0	.....	18.0	10.0
Joe alley	Neil avenue	....	15	1- 50	8.7	16.2	.....	24.3	15.6
Joe alley	Doe alley	....	33	1- 74	63.0	23.9	116.6	108.0	45.0
Joe alley	Perry street	....	42	1-200	72.0	4.3	120.9	114.0	42.0

TABLE NO. 11.—(Continued.)
Indianola Sewer District.

Formula Values { c= 0.31, s=30.00, r= 2.75

Al. n. Maynard	Adams street	....	15	1- 50	8.7	7.1	.....	8.8	.....
Findlay avenue	Maynard avenue	....	24	1-125	20.3	7.9	15.0	15.0	.....
Al. s. Maynard	Adams street	....	15	1- 73	7.2	7.8	.....	9.0	.....
Findlay avenue	Knickerbocker	....	24	1-125	20.3	13.5	28.5	25.0	4.7

TABLE NO. 11—Indianola Sewer District (Continued).

Sewer	Location of Test	Size		Grade	Capacity in C. F. S.	Initial Area Drained	Total Are Drained	Storm Flow C. F. S.	Excess Flow
		Ft	In.						
Al. s. Knickerbocker	East avenue	....	15	1–400	3.0	9.9	.....	11.0	8.0
Al. s. Knickerbocker	Adams street	....	24	1–200	16.0	13.5	42.0	33.5	17.5
Adams street	Oakland ave. produced	....	24	1– 50	34.0	.....	50.1	39.0	5.0
Adams street	Norwich avenue	....	24	1–100	23.0	23.0	73.1	52.3	29.3
Al. w. Tuller street	Lane avenue	....	15	1–250	4.0	8.4	.....	9.3	5.3
Al. w. Summit street	Northwood avenue	....	15	1– 77	7.0	6.4	.....	7.5	.....
Al. w. Lane street	Indianola	....	15	1– 80	6.8	4.7	11.1	11.3	4.5
Al. w. Indianola	Northwood avenue	....	15	1– 63	7.7	10.7	.....	11.0	3.3
Al. w. Lane street	Dayton avenue	....	20	1– 80	15.6	4.4	26.2	23.0	7.4
Al. w. Lane street	Waldeck ave. produced	....	20	1– 33	25.5	14.3	40.5	32.5	7.0
Lane avenue	Tuller street	....	30	1–100	42.0	.....	122.0	79.5	37.5
Al. e. High	Alley north Lane	....	15	1– 67	7.5	7.3	.....	8.9	.....
Al. e. High	Woodruff avenue	....	36	1– 63	85.0	14.5	143.8	90.0	5.0
Al. e. High	Sixteenth avenue	....	36	1–100	68.0	14.3	158.1	97.5	29.5
Waldeck avenue	Woodruff avenue	....	48	1– 77	167.0	16.1	.....	15.7	.....
Waldeck avenue	Sixteenth avenue	....	54	1– 78	228.0	13.2	29.3	25.3	.....
Sixteenth avenue branch	Indianola avenue	....	48	1– 38	234.0	16.8	.....	16.7	.....
Sixteenth avenue branch	Waldeck avenue	....	48	1– 44	225.0	12.1	28.9	25.0	.....
Al. e. High street	Fourteenth avenue	....	72	1–115	407.0	.....	248.5	140.0	.....
Al. n. Ninth avenue	McDonald street	....	15	1–100	6.1	7.0	.....	8.1	2.0
Al. n. Ninth avenue	Wesley avenue	....	20	1– 77	16.0	25.2	30.2	26.0	10.0
Al. e. High street	Woodward avenue	....	24	1– 63	28.5	11.8	42.0	34.5	6.0
Al. N. Woodward avenue	McDonald street	....	15	1– 56	8.2	7.0	.....	8.1	.....
Al. N. Woodward avenue	Summit street	....	15	1– 56	8.2	7.7	14.7	14.8	6.6
Al. e. High street	Chittenden	....	30	1–100	42.0	12.0	88.7	50.0	8.0
Al. e. High street	Twelfth avenue	....	30	1–100	42.0	14.0	82.7	58.3	16.3
Al. e. High street	Alley s. Thirteenth ave	....	30	1–200	28.5	10.6	93.3	63.7	35.2
Al. e. High street	Alley n. Thirteenth ave	....	15	1–200	4.4	9.0	.....	10.3	5.9

TABLE NO. II—Indianola Sewer District (Concluded)

Sewer	Location of Test	Size Ft	Size In.	Grade	Capacity in C. F. S	Initial Area Drained	Total Area Drained	Storm Flow C. F. S	Excess Flow
Thirteenth avenue	High street	....	48	1–100	148.0	.....	110.2	72.5	.....
Main sewer	500 ft. w. High	7	9	1–235	558.0	.....	372.0	192.5	.....
Hunter avenue	Ninth avenue	....	20	1–125	12.6	5.8	.....	7.4	.....
Al. n. Ninth avenue	Highland street	....	15	1–125	5.6	7.6	.....	8.8	3.2
Hunter avenue	Tenth avenue	....	20	1–125	12.6	10.6	24.0	21.5	8.9
Hunter avenue	Eleventh avenue	....	24	1–125	20.3	20.7	44.7	36.0	15.7
Main sewer	1000 ft. w. High	7	9	1–220	580.0	.....	430.0	217.0	.....

The sewer remains the same to the outlet; all storm flow of campus going through the small creek.

Estimated Storm Flow from Territory East of Corporate Limits at Summit Street, with { c=0.31, s=1.50, r=2.75

Summit street	Eighteenth avenue	....	48	1– 40	232.0	.....	116.2	58.0	.....
Summit street	Twentieth avenue	....	48	1– 50	205.0	.....	609.2	215.0	.....
Summit street	Thirteenth avenue	....	36	1– 50	95.0	.....	223.7	97.0	.....
Total	....	....	....	.....	.....	.....	959.1	310.0	.....

Add areas east of corporate limits as shown in three last lines above for total area drained by main sewers.

TABLE NO. 11.—(Continued.)
King Avenue Sewer District.

Formula Values { c= 0.45, s=20.00, r= 2.75

Sewer	Location of Test	Size Ft.	Size In.	Grade	Capacity in C. F. S.	Intial Area Drained	Total Area Drained	Storm Flow C. F. S.	Excess Flow
Al. w. Perry	Eighth avenue	....	24	1–670	8.7	12.5	.....	16.6	7.9
Eighth avenue	Neil avenue	....	24	1–200	16.0	10.0	.....	14.3	.....
Al. s. Eighth avenue	Alsop street	....	24	1– 32	41.0	14.6	24.0	28.8	.....
Al. w. Perry	Alley south Eighth	....	30	1–670	16.0	.....	39.1	42.4	26.4
King avenue	Alley w. Perry	....	48	1–670	57.0	.....	73.8	71.0	14.0
Al. w. Perry	Sixth avenue	....	15	1– 67	7.5	9.5	.....	13.8	6.3
Al. w. Perry	Seventh avenue	....	24	1–200	16.0	9.8	19.3	24.0	8.0
Al. w Perry	King avenue	....	24	1–200	16.0	8.2	27.5	32.1	16.1

TABLE NO. 11.—(Continued.)
First Avenue Sewer District.

Formula Values { s=15.00, c= 0.45, r= 2.75

Al. w. Michigan	Second avenue	....	15	1–220	4.3	8.6	.....	13.6	9.3
Al. w. Oregon	Second avenue	....	15	1–180	4.6	7.9	.....	11.6	7.0
Al. e. Perry	Second avenue	....	15	1–200	4.4	7.3	.....	10.6	6.2
First avenue	Perry street	....	24	1– 64	28.0	.....	27.9	30.6	2.6
First avenue	Oregon avenue	....	18	1– 80	12.0	5.5	14.1	17.1	5.1
First avenue	First alley w. Perry st.	....	36	1–100	68.0	15.6	43.5	43.5	.....

TABLE NO. 11.—(Continued.)

Northwest Main Sewer District.

Formula Values { c= 0.62, s=15.00, r= 2.75

Sewer	Location of Test	Size Ft	Size In.	Grade	Capacity in C. F. S.	Initial Area Drained	Total Area Drained	Storm Flow C. F. S	Excess Flow
High street	Eighth avenue	....	15	1–333	3.4	10.0	.....	20.0	16.6
High street	Euclid avenue	....	18	1–134	9.0	7.3	17.3	29.8	20.8
High street	Seventh avenue	....	20	1–134	12.3	6.8	24.1	38.4	26.1
Al. s. Sixth avenue	Courtland avenue	....	15	1– 67	7.5	9.4	.....	18.0	10.5
High street	Fifth avenue	....	30	1– 90	44.0	8.4	41.9	58.0	14.0
Peters alley	Seventh avenue	....	12	1– 90	3.7	7.4	.....	14.3	10.6
Wesley avenue	Fifth avenue	....	18	1– 45	15.1	10.6	18.0	30.5	15.4
Al. e. Fourth street	Gooding avenue	....	15	1–150	5.0	9.4	.....	18.0	13.0
Al. w. Katherine	Gooding avenue	....	18	.....	.....	9.4	.....	18.0	.....
Al. e. Katherine	Gooding avenue	....	18	.....	.....	9.4	.....	18.0	.....
Sixth avenue	Katherine street	....	54	1–100	200.0	34.4	.....	49.6	.....
Sixth avenue	McDonald	....	60	1–184	147.0	17.7	52.1	70.5	.....
Sixth avenue	Fourth street	....	60	1–184	147.0	17.7	69.8	87.0	.....
Al. w. Fourth street	Fifth avenue	....	78	1–295	310.0	29.0	98.8	116.7	.....
Al. s. Fourth avenue	Sixth avenue	....	24	1–167	17.6	20.9	.....	33.4	15.8
Al s. Fourth avenue	Fourth street	....	27	1–100	32.0	21.9	42.8	59.2	27.2
Greenwood avenue	High street	....	78	1–328	295.0	.....	229.4	226.5	.....
Hunter avenue	Eighth avenue	....	15	1–400	3.0	8.5	.....	17.2	14.2
Hunter avenue	King avenue	....	18	1–400	5.1	24.5	33.0	48.0	42.9
Al. e. Hunter	Herman street	....	24	1–400	11.7	23.6	56.6	74.0	62.3
Al. n. Fifth avenue	Forsythe avenue	....	15	1–400	3.0	9.4	.....	18.0	15.0
Dennison avenue	Fifth avenue	....	24	1–400	11.7	19.1	85.1	103.6	91.9
Dennison avenue	Fifth avenue	....	60	1–126	240.0	.....	85.1	103.6	.....

TABLE NO. II—Northwest Main Sewer District (Continued).

Sewer	Location of Test	Size		Grade	Capacity in C. F. S	Initial Area Drained	Total Area Drained	Storm Flow C. F. S.	Excess Flow
		Ft.	In.						
Dennison avenue	Fourth avenue	....	84	1–300	377.0	.....	332.0	307.0	.....
Third avenue	Summit street	....	18	1–333	5.7	11.0	.....	19.7	14.0
Third avenue	High street	....	18	1–130	9.1	12.0	23.0	37.2	28.1
Dennison avenue	Starr avenue	....	84	1–144	544.0	.....	373.6	335.0	.....
Second avenue	Summit street	....	18	1–200	7.3	7.5	.....	14.8	7.5
Second avenue	High street	....	18	1–200	7.3	10.0	17.5	30.2	22.9
Hunter avenue	Second avenue	....	84	1–144	544.0	.....	411.5	366.0	.....
Ridge alley	Third avenue	....	18	1–200	7.3	11.6	.....	20.5	13.2
Ridge alley	Second avenue	....	18	1–200	7.3	5.2	16.8	29.2	21.9
Sunnyside alley	Third avenue	....	15	1–218	4.3	14.3	.....	24.9	20.6
Highland street	First avenue	....	15	1–218	4.3	7.8	22.1	34.9	30.6
First avenue	Fourth street	....	30	1– 44	63.0	18.6	.....	31.0	.....
First avenue	Fourth street	....	30	1– 44	63.0	10.9	29.5	44.5	.....
Miami alley	Warren street	....	18	1–330	5.7	8.0	.....	16.1	10.4
Miami alley	Hunt avenue	....	18	1–330	5.7	9.0	17.0	29.6	23.9
First avenue	Hamlet street	....	30	1– 44	63.0	6.2	35.7	50.5	.....
First avenue	High street	....	30	1–350	22.5	34.0	69.7	87.0	64.7
First avenue	Dennison avenue	....	30	1– 73	48.5	.....	88.5	106.6	58.1
Glenn alley	Buttles avenue	....	18	1–250	6.6	10.7	.....	19.6	13.0
Al n. Buttles	500 ft. east of Dennison	....	20	1–250	8.8	20.9	31.6	46.5	37.7
Dennison avenue	First avenue	....	24	1–425	11.3	13.9	45.5	63.0	51.7
First avenue	Neil avenue	....	84	1–231	430.0	.....	598.1	488.0	58.0
Al. w. Neil avenue	Sixth avenue	....	12	1–290	2.0	12.4	.....	22.2	20.2
Al. w. Neil avenue	Third avenue	....	15	1–265	3.8	16.4	28.8	43.5	39.7
Al. w. Neil avenue	First avenue	....	18	1–265	6.4	17.6	46.4	64.0	57.6
A. w. Harrison	Third avenue	....	18	1–333	5.7	12.6	.....	22.6	16.9
A. w. Harrison	First avenue	....	18	1–333	5.7	12.6	.....	22.6	16.9
Al. w. Pennsylvania	Third avenue	....	15	1–250	4.0	9.9	.....	19.2	15.2

TABLE NO. II—Northwest Main Sewer District (Concluded).

Sewer	Location of Test	Size		Grade	Capacity in C. F. S.	Initial Area Drained	Total Area Drained	Storm Flow C F. S	Excess Flow
		Ft.	In.						
Alley w. Pennsylvania	First avenue	....	18	1–250	6.6	10.4	20.3	32.8	26.2
First avenue	Harrison avenue	....	18	1–330	5.7	.....	42.8	60.6	54.9
Delaware avenue	First avenue	....	84	1–197	465.0	.....	687.3	549.0	84.0
Poplar avenue	Pennsylvania avenue	....	20	1–300	8.0	8.8	.....	16.5	8.5
Harrison avenue	Alley n. Buttles	....	18	.....	.....	18.6	.....	30.5	.....
Delaware avenue	Buttles avenue	....	96	1–560	395.0	19.3	725.2	572.0	177.0
Poplar avenue	Harrison avenue	....	20	1–300	8.0	7.7	16.5	28.2	20.2
Al. e. Neil avenue	Collins avenue	....	18	.....	.....	.....	14.3	25.0	.....
Poplar avenue	Neil avenue	....	18	.....	.....	8.7	23.0	36.8	.....
Henry street	Poplar avenue	....	96	1–335	512.0	20.7	785.4	614.0	102.0
Conklin avenue	Harrison avenue	....	12	1–143	2.9	7.5	.....	14.8	11.9
Charles street	Harrison avenue	....	24	1–180	17.3	9.6	.....	18.5	.....
Cozzins street	Dublin avenue	....	96	1–166	720.0	67.0	893.4	672.0	.....
Henry street	Spruce street	....	96	1–389	470.0	.....	826.4	635.0	165.0
Cozzins street	Spring street	....	96	1–166	720.0	32.7	926.1	697.0	.....
Estimated Storm Flow from Farm Lands with Values Equal to { s=7.5, c=0.31, r=2 75							688 0	238.0	

TABLE NO. 11.—(Continued.)

West Street Main Sewer.

Formula Values { s=17.0, c= 0 75, r= 2.75

Sewer	Location of Test	Size Ft.	Size In.	Grade	Capacity in C. F. S.	Initial Area C. F. S.	Total Area Drained	Storm Flow C. F S.	Excess Flow
Vine street	Park street	....	30	1–100	41.5	17.4	.....	35.8	.....
Vine street	Armstrong street	....	30	1–100	41.5	8.6	26.0	48.3	6.8
Vine street	Lake alley	....	30	1–100	41.5	10.0	36.0	63.4	21.9
Lake alley	Goodale street	....	36	.....	.....	33.3	.....	59.9	.....
Lake alley	Spruce street	....	36	.....	.....	8.9	42.2	73.8	.....
Spruce street	Dennison avenue	....	48	1–307	84.0	6.4	.....	15.6	.....
Lake alley	Railroad street	....	60	1–474	123.0	.....	88.1	131.5	8.5
West street	North Randolph	....	60	1–146	220.0	21.3	109.4	156.0	.....
West street	South Randolph	....	60	1–146	220.0	58.1	167.5	220.0	.....
West street	Spring street	....	60	1–146	220.0	27.4	194.9	246.0	26.0
Depot yards	East of Third street	....	....	.....	.....	21.8	.....	41.5	.....
Depot yards	High street	....	48	1–100	147.0	18.4	40.2	69.8	.....
Randolph street	Park street	....	48	1–175	111.0	17.9	58.1	94.6	.....
Naghten street	Stone sewer	....	49	1–116	137.0	.....	.....	.....	.....

TABLE NO. 11.—(Continued.)

Spring Street Sewer District.

Formula Values { s=10.0, c= 0.75, r= 2.75

Formula Values { s=16.0, c= 0 75, r= 2.75

Sewer	Location of Test	Size Ft	Size In.	Grade	Capacity in C. F. S.	Initial Area Drained	Total Area Drained	Storm Flow C. F. S.	Excess Flow
Cleveland avenue	Buckingham street	....	30	1–133	36.5	60.4	.....	87.5	51.0
Grove street	Cleveland avenue	....	15	1– 90	6.5	7.0	.....	15.0	8.5
Naghten street	Kelly alley	....	24	1–100	23.0	12.0	.....	23.4	0.4
Mt. Vernon avenue	Grant avenue	....	30	1–133	36.5	27.1	87.5	117.6	81.1
Al. e. Grant avenue	Edwards street	....	15	1–125	5.5	10.0	.....	21.0	15.5
Al. w. Grant avenue	Edwards street	....	27	1–250	19.7	45.0	.....	68.0	48.3
Al. w. Mosette	Edwards street	....	15	1–250	3.9	14.0	.....	27.5	23.6
Al. w. Grant avenue	Edwards street	....	30	1–250	26.0	63.5	.....	92.0	66.0
Sixth street	Naghten street	....	48	1– 90	156.0	.....	161.0	192.0	36.0
Payne alley	Grove street	....	15	1–000	.....	12.0	.....	23.4	.....
Payne alley	Naghten street	....	15	1–000	.....	8.0	20.0	36.0	.....
Naghten street	Fourth street	....	30	1–000	.....	9.8	29.8	49.5	.....
Spring street	Fifth street	....	48	1– 90	156.0	25.6	186.6	215.0	59.0
Fourth street	University	....	15	1–140	5.3	18.0	.....	36.3	31.0
		....	18	1–200	7.3	.....	.....	17.6	10.3
Goodale street	Morrison	....	12	1– 18	8.0	33.0	.....	58.6	50.6
		....	18	1– 62	13.3	.....	.....	28.5	15.2
Kerr street	Swan street	....	48	1–256	92.0	2.0	82.0	122.0	30.0
Kerr street	Lincoln street	....	36	1– 95	69.6	36.0	.....	63.1	.....
Kerr street	University	....	48	1–100	148.0	34.0	70.0	108.5	.....
Miami alley	Swan street	....	18	1–200	7.3	10.0	.....	22.7	15.4
Third street	Chestnut street	....	48	1–263	90.0	60.1	142.1	189.3	99.3
Pearl street	Hickory	....	60	1–127	235.0	20.0	Ry. yds.	36.0	.....

TABLE NO. 11.—(Continued.)
Spring Street Sewer District (Continued).

Sewer	Location of Test	Size Ft.	Size In.	Grade	Capacity in C. F. S.	Initial Area Drained	Total Area Drained	Storm Flow C. F. S.	Excess Flow
Spring street	Third street	....	60	1–170	204.0	Ry. yds.	339.4	350.0	83.0
		....	36	1–114	63.0				
Spring street	High street	....	72	1– 83	480.0	.....	370.0	370.0	.....
		....	36	1–114	63.0				
Spring street	Gorman street	....	84	1–110	625.0	.....	400.6	397.0	.....
Gorman street	Elm street	....	84	1–100	650.0	58.1	458.7	440.0	.....

Formula Values { c= 0 75 ; s=10.00 ; r= 2.75

Long Street Sewer District.

Gay street	Fifth street	....	36	1–166	52.6	10.0	.....	21.0	.....
Fourth street	Gay street	....	48	1–166	113.6	2.5	12.5	24.0	.....
Pearl street	Elm street	....	36	1–100	68.0	20.0	.....	36.0	.....
Long street	Fifth street	....	24	1– 67	27.6	8.0	.....	17.8	.....
Long street	Lazelle street	....	36	1– 70	81.0	12.1	20.1	36.1	.....
Long street	High street	....	48	1–200	104.0	23.8	43.9	68.0	.....
Long street	Water street	....	42	1– 63	130.0	6.1	50.0	75.0	.....

TABLE NO. 11.—(Continued.)

Broad Street Sewer District.

Formula Values { s=10.0, c= 0.62, r= 2.75

Sewer	Location of Test	Size Ft.	Size In	Grade	Capacity in C. F. S.	Initial Area Drained	Total Area Drained	Storm Flow C. F. S.	Excess Flow
Seventeenth street	Long street	....	30	1–400	20.6	14.0	.....	22.8	2.2
Seventeenth street	Broad street	....	30	1–400	20.6	14.0	28.0	39.6	19.0
Monroe avenue	Long street	....	18	1–400	5.2	11.0	.....	18.0	12.8
Monroe avenue	Broad street	....	20	1–400	7.0	10.0	21.0	31.0	24.0
Garfield avenue	Long street	....	24	1–400	11.8	10.8	.....	17.7	5.9
Garfield avenue	Broad street	....	24	1–400	11.8	12.4	23.2	34.0	22.2
Hamilton avenue	Holly alley	....	18	1–300	6.0	16.0	.....	25.0	19.0
Lexington avenue	Long street	....	24	1–200	16.5	8.2	24.2	35.0	18.5
Lexington avenue	Broad street	....	24	1–200	16.5	12.5	36.7	48.8	32.3
Mt. Vernon avenue	Jefferson avenue	....	15	1–133	5.4	8.0	.....	14.4	9.0
Jefferson avenue	Spring street	....	24	1–310	13.0	19.0	27.0	38.5	25.5
Long street	Everett alley	....	24	1–150	18.2	9.7	36.7	48.8	30.6
McCoy street	Washington	....	12	1–240	2.3	7.0	.....	13.0	10.7
Grove street	Washington	....	18	1–200	7.4	10.0	.....	17.0	9.6
Washington avenue	Buckingham	....	24	1–250	14.4	11.0	.....	18.0	3.6
Washington avenue	Mt. Vernon avenue	....	24	1–250	14.4	22.0	33.0	44.0	29.6
Washington avenue	Long street	....	30	1–200	29.0	47.6	80.6	91.0	62.0
Ninth street	Long street	....	18	1–220	7.0	7.0	.....	13.0	6.0
Ninth street	Broad street	....	18	1–220	7.0	11.0	18.0	27.6	20.6
Cleveland avenue	Long street	....	20	1–000	.....	6.0	.....	12.0	.....
Cleveland avenue	Broad street	....	20	1–000	.....	6.0	12.0	19.1	.....
Broad street	Garfield avenue	....	48	1–376	76.0	99.2	.....	107.0	31.0
Broad street	Eleventh street	....	48	1– 67	180.0	156.9	.....	156.0	.....
Broad street	Washington	....	60	1– 86	287.0	245.5	.....	221.0	.....
Broad street	Fifth street	....	42	1–213	71.0	321.1	.....	273.0	28.0
		....	60	1–230	174.0				

TABLE NO. 11.—Broad Street Sewer District (Contined).

Sewer	Location of Test	Size Ft.	Size In	Grade	Capacity in C. F. S	Initial Area Drained	Total Area Drained	Storm Flow C. F. S.	Excess Flow
Broad street	Third street	....	42	1–213	71.0				
		....	....	.....	.....	333.0	.....	280.0	99.0
		....	60	1–583	110.0				
Broad street	High street	....	42	1–213	71.0				
		....	....	.....	.....	340.0	.....	286.0	.....
		....	48	1– 35	250.0				

TABLE NO. 11.—(Continued.)

Peters' Run Sewer District.—Oak Street Sub-District.

Formula Values { c= 0.75, s=10.00, r= 2.75

Oak street	Washington	....	20	1– 75	16.5	28.0	.....	47.0	30.5
Oak street	Washington	....	48	1–137	125.0	28.0	.....	47.0	.....
Oak street	Fourth street	....	48	1–187	107.0	36.0	64.0	93.0	.....
Town street	Washington	....	24	1–100	23.0	19.0	.....	36.0	13.0
Town street	Grant avenue	....	24	1–100	23.0	12.5	31.5	52.0	29.0
Chapel street	Fourth street	....	36	1–120	61.0	24.0	.....	48.0	.....
Walnut street	Grant avenue	....	36	1–120	61.0	28.0	.....	58.0	.....
Walnut street	Fourth street	....	36	1–120	61.0	40.0	.....	62.0	1.0
Cherry street	300 ft. e. Main	....	48	1–165	114.0	55.0	.....	83.0	.....
				1–270	89.0				
Cherry street	Grant avenue	....	60	1–125	240.0	27.0	82.0	112.0	.....
Cherry street	Fourth street	....	60	1–125	240.0	9.0	91.0	121.0	.....
Mound street	200 ft. e. Eighteenth	....	36	1–250	43.0	8.0	.....	18.0	.....
Mound street	Grant avenue	....	48	1–118	137.0	48.0	56.0	83.0	.....
Mound street	Fourth street	....	48	1– 84	160.0	27.0	83.0	113.0	.....
Fulton street	Seventeenth street	....	18	1–270	6.3	9.0	.....	19.0	12.7

TABLE NO. 11.—(Continued.)—Oak Street Sub-District (Conc'uded). Peters Run Sewer District (Concluded).

Sewer	Location of Test	Size Ft.	Size In.	Grade	Capacity in C. F. S.	Initial Area Drained	Total Area Drained	Storm Flow C. F. S.	Excess Flow
Fulton street	Monroe avenue	....	20	1–270	8.5	6.9	15.9	29.0	20.5
Fulton street	Parsons avenue	....	24	1–270	14.0	25.3	41.2	64.0	50.0
Fulton street	Fourth street	....	48	1–115	137.0	27.8	69.0	97.0	.....
Livingston avenue	Crawford street	....	24	1–286	13.5	21.0	.....	37.0	23.5
Livingston avenue	Parsons avenue	....	24	1–286	13.5	14.5	35.5	57.0	43.5
Livingston avenue	Parsons avenue	....	36	1–340	36.5	35.5	.....	57.0	20.5
Livingston avenue	Seventh street	....	36	1– 95	69.5	32.5	68.0	97.0	27.5
Livingston avenue	Harrison alley	....	36	1– 95	69.5	28.0	96.0	126.0	56.5
Fourth street	Fulton street	....	36	1– 80	76.0	15.0	111.0	140.0	64.0
Third street	Kossuth street	....	24	1–227	15.0	9.0	.....	19.0	4.0
Third street	Baker alley	....	36	1–227	45.0	9.0	18.0	35.0	.....
Third street	Beck street	....	48	1–500	66.0	15.0	33.0	53.0	.....
Pearl street	Reinhard avenue	....	36	1–400	33.0	36.4	32.4	89.0	.....
Pearl street	Baker alley	....	48	1–1100	44.0	24.6	61.0	89.0	actual
Pearl street	Baker alley	....	48	1–315	83.0	.....	61.0	65.0	obtnble
Pearl street	Beck street	....	48	1– 80	165.0	27.0	88.0	118.0	.....
Mohawk street	Reinhard avenue	....	36	1–500	30.0	36.0	.....	54.0	24.0
Sycamore street	Ninth street	....	20	1–200	16.0	24.2	.....	42.0	26.0
Sycamore street	Seventh street	....	36	1–120	61.0	15.3	39.5	63.0	2.0
Sycamore street	Lazelle street	....	36	1–150	55.0	68.5	108.0	138.0	83.0
Pearl street	100 ft. n. Beck	....	60	1–100	266.0	109.0	217.0	250.0	.....
Beck street	Third street	....	24	1–100	23.0	21.0	.....	37.0	14.0
Main Sewer—									
Fourth street	Chapel street	....	60	1–435	70.0	88.0	.....	118.0	48.0
Fourth street	Chapel street	....	60	1–150	217.0	obtainable grade.			
Fourth street	Main street	....	72	1–140	365.0	161.0	249.0	272.0	.....
Fourth street	Main street	....	72	1–227	287.0	equals average grade.			
Fourth street	Fulton street	....	78	1–550	228.0	.....	533.0	500.0	.....
Fourth street	Fulton street	....	78	1–227	356.0	obtainable grade.			
Blenkner street	Front street	....	78	1– 64	665.0	.....	566.0	522.0	.....
				1–122	483.0				
Blenkner street	Front street	....	84	1–110	625.0	.....	818.0	703.0	78.0
West of Canal	.....	....	84	1–435	312.0	.....	842.0	720.0	408.0

TABLE NO. 11.—(Continued.)

Rich Street Sewer District.

Formula Values { c=0 75, s=7.50, r=2 75

Sewer	Location of Test	Size Ft.	Size In	Grade	Capacity in C. F. S.	Initial Area Drained	Total Area Drained	Storm Flow C. F. S.	Excess Flow
Main street	Grant avenue	....	24	1–100	23.0	13.8	.....	23.5	.....
Rich street	Grant avenue	....	18	1–128	9.2	8.3	.....	18.0	8.8
Rich street	Grant avenue	....	36	1–110	65.0	.....	22.1	36.0	.....
Rich street	Fourth street	....	48	1–600	60.0	9.2	31.3	48.0	.....
Rich street	High street	....	48	1–100	148.0	21.4	52.7	74.0	.....
Rich street	Front street	....	30	1– 53	57.0	17.3	70.0	92.0	35.0
Rich street	Scioto street	....	36	1– 48	95.0	11.0	81.0	104.0	9.0

TABLE NO. 11.—(Continued.)

Moler Street Sewer District.

Formula Values { c=0 62, s=7.50, r=2.75

Forest street	Oakwood avenue	....	30	1–270	25.0	33.0	.....	41.0	16.0
Forest street	Gilbert street	....	36	1–280	40.0	60.0	93.0	95.0	55.0
Forest street	Eighteenth street	....	36	1–220	46.0	38.0	131.0	126.0	80.0
Forest street	West alley	....	36	1–220	46.0	69.0	200.0	177.0	131.0
Section alley	Ebner street	....	48	1–400	73.0	51.0	251.0	213.0	140.0
Blackberry alley	Germania	....	48	1–400	73.0	74.0	325.0	262.0	189.0
Mozart street	Mithoff street	....	60	1–400	133.0	70.0	395.0	305.0	172.0
Fourth street	Frebis avenue	....	60	1–400	133.0	59.0	454.0	340.0	207.0

TABLE NO. 11.—(Continued). —Moler Street Sewer District (Concluded).

Sewer	Location of Test	Size Ft	Size In	Grade	Capacity in C. F. S.	Initial Area Drained	Total Area Drained	Storm Flow C. F. S.	Excess Flow
Parsons avenue	Siebert street	....	24	1–200	16.5	29.0	.....	38.0	21.5
Parsons avenue	Deshler avenue	....	48	1–200	104.0	30.0	59.0	67.0	.....
Moler street	Fifth street	....	57	1–250	151.0	34.0	93.0	85.0	.....
Moler street	Third street	....	60	1–140	225.0	.....	571.0	403.0	178.0
Moler street	High street	....	60	1–250	167.0	19.0	590.0	417.0	250.0
Logan alley	Columbus street	....	15	1–330	3.4	12.1	.....	18.5	15.1
West alley	Swayne street	....	15	1–250	4.0	4.4	.....	8.2	4.2
West alley	Forest street	....	15	1–250	4.0	11.4	.....	17.0	13.0
Second al. w. Beech	Section alley	....	15	1–100	6.1	14.0	.....	22.0	15.9
Barth alley	Blackberry	....	15	1–140	5.3	16.0	.....	24.0	18.7
Redbud alley	Blackberry	....	15	1–160	5.0	16.0	.....	24.0	19.0
Nursery Lane	Jaeger street	....	18	1–240	6.7	19.0	.....	27.5	20.8
Pearl street	Gates street	....	15	1–100	6.1	10.0	.....	16.1	10.0
Pearl street	Moler street	....	18	1–100	9.2	19.2	.....	27.9	18.7
Moler street	Front street	....	42	1– 20	210.0	.....	611.0	433.0	223.0

TABLE NO. 11.—(Continued.)

Alum Creek Sewer District.

Formula Values { c=0 62 ; s=7.5 ; r=2.75

Al. w. Lexington	Leonard avenue	....	12	1–400	1.7	10.0	.....	16.4	14.7
Al. w. Lexington	Buckingham street	....	15	1–400	3.0	8.0	18.0	27.0	24.0
Al. w. Hamilton	Leonard avenue	....	18	1–400	5.2	8.0	.....	14.0	8.8
Al. w. St. Clair	Leonard avenue	....	15	1–400	3.0	8.0	.....	14.0	11.0
Al. w. Hamilton	Buckingham street	....	20	1–400	7.0	8.0	16.0	24.0	17.0

TABLE NO. 11.—Alum Creek Sewer District (Continued).

Sewer	Location of Test	Size		Grade	Capacity in C F. S	Initial Area Drained	Total Area Drained	Storm Flow C. F S	Excess Flow
		Ft.	In						
Al. w. St. Clair	Buckingham street	....	18	1–400	5.2	8.0	16.0	24.0	18.8
Buckingham street	Lexington ave	....	18	1–400	5.2	.....	18.0	27.0	21.8
Buckingham street	Hamilton ave	....	24	1–400	11.8	19.0	37.0	46.0	34.2
Buckingham street	St. Clair ave	....	36	1–400	33.6	20.2	57.2	66.0	32.4
Al. w. Garfield	Curtis avenue	....	15	1–250	3.9	12.0	.....	18.2	14.3
Al. w. Garfield	Felton avenue	....	30	1–400	20.6	12.0	24.0	33.0	12.4
Al. w. Garfield	Buckingham street	....	30	1–400	20.6	7.0	31.0	40.0	19.4
Al. w. Monroe	Buckingham street	....	12	1–200	2.5	9.0	.....	15.0	12.5
Al. w. Galloway	Leonard avenue	....	12	1–100	3.5	5.0	.....	9.0	5.5
Al. w. Galloway	Buckingham street	....	12	1–150	2.9	10.0	.....	16.4	13.5
Buckingham street	Garfield avenue	....	42	1–400	51.0	35.0	92.2	96.0	45.0
Al. n. Mt. Vernon	Galloway avenue	....	45	1–400	61.0	22.5	114.7	115.0	54.0
Denmead avenue	N. corp. line	....	48	1–200	104.0	76.0	.....	83.0	.....
Leonard avenue	Galloway avenue	....	60	1–500	187.0	23.0	99.0	101.0	.....
Mt. Vernon avenue	Denmead avenue	....	72	1–500	194.0	11.8	225.5	194.0	.....
Al. w. Hayes	Toronto street	....	15	1–400	3.0	7.0	.....	12.4	9.4
Al. n. Atcheson	Wetmore	....	18	1–400	5.2	3.5	10.5	16.8	11.6
Al. w. Wetmore	Toronto street	....	15	1–330	3.4	7.0	.....	12.4	9.0
Al. n. Atcheson	Trevitt street	....	12	1–140	3.0	3.5	.....	22.4	19.4
Al. e. Twentieth street	Toronto street	....	12	1–140	3.0	14.0	.....	22.4	19.4
Medill street	Twentieth street	....	24	1–400	11.8	.....	50.0	59.0	47.2
Bolivar street	Atcheson street	....	24	1–100	23.0	.....	66.9	75.0	52.0
Al. N. Hildeth street	Gibbon street	....	12	1–300	2.0	4.0	.....	7.6	5.6
Al. N. Hildeth street	Twentieth street	....	12	1– 70	4.0	11.0	15.0	23.0	18.9
Al. s. Hildreth street	Twentieth street	....	15	1– 86	6.6	14.0	.....	22.4	15.8
Bolivar street	Mt. Vernon ave	....	30	1–100	43.0	.....	102.5	104.0	61.0
Al. n. Mann	Champion avenue	....	18	1–250	6.6	11.0	.....	17.5	10.9
Thorn street	Alley n. Long	....	20	1–113	13.3	18.7	29.7	39.0	25.7

TABLE NO. 11.—Alum Creek Sewer District (Continued).

Sewer	Location of Test	Size		Grade	Capacity in C. F. S.	Initial Area Drained	Total Area Drained	Storm Flow C. F. S.	Excess Flow
		Ft.	In.						
Al. w. Ohio	2nd al. n. Long	....	12	1–100	3.5	15.0	.....	23.0	19.5
Long street	Twenty–second street	....	24	1–160	18.0	.....	47.8	57.0	39.0
Al. w. Twenty-second	Spring street	....	12	1– 85	3.8	6.0	.....	11.0	7.2
Al. n. Long street	Twenty–first street	....	15	1–330	3.4	11.0	.....	17.5	14.1
Long street	Twentieth street	....	36	1–140	57.6	23.0	70.8	78.0	20.4
Nineteenth street	Spring street	....	18	1–150	8.5	6.0	.....	11.0	2.5
Winner avenue	Broad street	....	15	1–100	6.0	14.0	.....	22.4	16.4
Ohio avenue	Broad street	....	12	1–200	2.5	18.0	.....	27.0	24.5
Twenty-first street	Broad street	....	18	1–167	8.0	7.0	.....	12.4	4.4
Broad street	Champion avenue	....	48	1–400	73.0	27.3	.....	36.4	.....
Broad street	Twenty–first street	....	48	1–400	73.0	36.7	64.0	72.0	.....
Eighteenth street	Mt. Vernon avenue	....	78	1–500	240.0	.....	328.0	262.0	22.0
Miami avenue	Long street	....	78	1–500	240.0	96.2	424.2	324.0	84.0
Hoffman street	Broad street	....	84	1–500	290.0	79.3	503.5	372.0	82.0
Madison avenue	Al. e. Hoffman	....	18	1–250	6.6	19.5	.....	27.5	20.9
Oak street	Hoffman	....	15	1–200	4.4	16.0	.....	24.0	19.6
Franklin avenue	Twenty–first street	....	15	1– 83	6.7	12.0	.....	18.4	11.7
Al. n. Oak street	Ohio avenue	....	18	1–200	7.4	12.0	.....	18.4	11.0
Wilson avenue	Bryden Road	....	24	1–300	13.4	8.0	.....	14.0	0.6
Wilson avenue	Main street	....	24	1–300	13.4	9.0	17.0	25.0	11.6
Al. w. Carpenter	Stone avenue	....	18	1–286	6.1	21.1	.....	30.0	23.9
Al. n. Livinstgon	Carpenter	....	24	1–670	8.7	11.0	32.1	42.0	33.3
Al. w. Gilbert	Stone avenue	....	15	1–250	3.9	7.0	.....	12.4	8.5
Al. w. Gilbert	Al. n. Livingston	....	18	1–330	5.7	6.0	13.0	20.4	14.7
Al. w. Twenty-second	Newton street	....	36	1–1000	21.5	.....	50.0	58.6	37.1
Shelby street	Twenty–second street	....	48	1–345	80.0	17.2	67.2	75.6	.....
Mooberry street	Linwood avenue	....	20	1–500	6.2	17.0	.....	25.0	18.8
Mooberry street	Wilson avenue	....	20	1–180	10.0	20.0	37.0	46.0	36.0

TABLE NO. 11.— Alum Creek Sewer District (Continued).

Sewer	Location of Test	Size		Grade	Capacity in C. F. S.	Intial Area Drained	Total Area Drained	Storm Flow C. F. S.	Excess Flow
		Ft.	In.						
Mooberry street	Clover alley	....	24	1–232	15.0	38.0	75.0	83.0	68.0
Champion avenue	Mooberry street	....	48	1–180	110.0	.....	173.2	157.0	47.0
Champion avenue	Main street	....	48	1–125	43.0	.....	204.0	180.0	137.0
Wilson avenue	McAllister avenue	....	18	1–125	9.3	21.0	.....	30.0	20.7
Al. w Miller avenue	Madison avenue	....	20	1–100	14.0	11.0	.....	17.5	3.5
Al. n. Fair avenue	Latta avenue	....	12	1–100	3.5	11.0	.....	17.5	14.0
Al. n. Fair avenue	Alley w. Miller	....	24	1–100	23.0	14.1	36.1	45.0	22.0
Al. n. Oak street	2nd alley w. Miller	....	12	1–125	3.1	12.5	.....	20.0	16.9
Al. n. Oak street	Miller avenue	....	12	1– 90	3.7	16.5	.....	24.3	20.6
Elliott alley	Miller avenue	....	12	1– 90	3.7	12.6	.....	20.0	16.3
Al. e. Miller avenue	Franklin avenue	....	48	1–500	66.0	10.0	75.2	83.0	17.0
Al. n. Bryden road	Miller avenue	....	12	1– 67	4.2	13.9	.....	21.6	17.4
Al. e. Miller	Bryden Road	....	48	1–500	66.0	.....	93.9	97.0	31.0
Al. e. Miller	Main street	....	48	1–500	66.0	29.8	123.7	123.0	57.0
Ohio avenue	Main street	....	84	1–500	290.0	.....	699.0	480.0	190.0
Main street	Champion avenue	....	84	1–500	290.0	.....	903.0	590.0	300.0
Main street	Rose street	....	72	1– 94	450.0	.....	1162.0	723.0	273.0
Main street	Fairwood avenue	9	....	1–270	775.0	.....	2013.0	1122.0	347.0
Main street	Fairwood avenue	9	....	1–540	545.0	average grade.			
Main street	Alum creek	9	....	1–540	545.0	.....	2143.0	1179.0	634.0

TABLE NO. 11.—Alum Creek Sewer District (Continued).
Franklin Park Branch.

NOTE—Formula Values for Franklin Park Sewer { c= 0.45 / s=13. 0 / r= 2 75

Sewer	Location of Test	Size Ft.	Size In.	Grade	Capacity in C. F. S.	Initial Area Drained	Total Area Drained	Storm Flow C. F. S.	Excess Flow
Al. n. Mt. Vernon	Johnston street	....	15	1- 80	6.9	10.9	.....	13.8	6.9
Al. n. Mt. Vernon	Eldridge street	....	15	1- 80	6.9	11.5	22.4	25.0	18.1
Al. w. Woodland	Mt. Vernon avenue	....	18	1-130	9.2	.....	22.4	25.0	15.8
Al. n. Clifton	Al. w. Hughes	....	12	1-100	3.5	8.0	.....	12.4	8.9
Al. n. Clifton	Johnson street	....	20	1- 70	16.5	22.8	.....	25.4	8.9
Al. w. Taylor	Al. n. Clifton	....	15	1-200	4.4	6.0	.....	9.0	4.6
Al. W. Mulberry	Clifton avenue	....	20	1-140	12.0	15.0	.....	17.8	5.8
Clifton avenue	Mulberry street	....	30	1- 70	50.0	22.7	45.5	43.6	.....
Al. w. Woodland	Al. n. Clifton	....	20	1-200	9.7	.....	.....	37.0	27.3
Al. e. Winner	Mann street	....	15	1-100	6.0	6.0	.....	9.0	3.0
Clifton avenue	300 ft. e. of Woodland	....	30	1- 50	58.0	.....	91.0	75.4	17.4
Burt avenue	Mann street	....	18	1-100	10.3	8.0	.....	12.4	2.1
Al. s. Mann street	Burt avenue	....	18	1- 67	13.0	11.0	25.0	26.6	13.6
Al. s. Long street	Taylor avenue	....	15	1- 60	8.0	11.0	.....	13.9	5.9
Al. s. Eastwood	Taylor avenue	....	15	1- 90	6.5	10.0	.....	12.8	6.3
Al. w. Mulberry	Long street	....	20	1- 67	17.0	.....	36.9	37.0	20.0
Eastwood avenue	Mulberry street	....	24	1- 67	28.0	25.7	62.6	56.0	28.0
Eastwood avenue	Woodland avenue	....	24	1- 67	28.0	23.3	85.9	72.0	44.0
Franklin sewer	Clifton avenue	....	84	1-667	253.0	.....	340.0	217.0	.....
Franklin sewer	Clifton avenue	....	84	1-667	253.0	91.0	431.0	264.0	11.0
Franklin sewer	Broad street	....	84	1-667	253.0	86.0	513.0	302.0	49.0
Franklin sewer	Fair avenue	....	84	1-667	253.0	97.0	610.0	345.0	92.0
Franklin sewer	Main street	....	84	1-667	253.0	129.0	739.0	404.0	151.0

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